INTERRELATIONS AMONG PIAGET'S FORMAL OPERATIONS, ERIKSON'S EGO IDENTITY, AND KOHLBERG'S PRINCIPLED MORALITY

by

M. Ann Cauble

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

ARIZONA STATE UNIVERSITY

May 1975

© M. Ann Cauble, 1975

ALL RIGHTS RESERVED

INTERRELATIONS AMONG PIAGET'S FORMAL OPERATIONS,

ERIKSON'S EGO IDENTITY, AND KOHLBERG'S

PRINCIPLED MORALITY

by

M. Ann Cauble

has been approved

February 1975

APPROVED:

Chairman

Supervisory Committee

ACCEPTED:

Department Chairman

Dean, Graduate College

INTERRELATIONS AMONG PIAGET'S FORMAL OPERATIONS, ERIKSON'S EGO IDENTITY, AND KOHLBERG'S PRINCIPLED MORALITY

by

M. Ann Cauble

An Abstract of a Dissertation Presented in
Partial Fulfillment of the Requirements
for the Degree
Doctor of Philosophy

ARIZONA STATE UNIVERSITY

May 1975

XUM

ABSTRACT

Three Piagetian formal operations tasks, Rest's Defining Issues Test of principled morality, and two Eriksonian measures--Constantinople's Inventory of Personality Development and Marcia's identity status interview were presented to 90 college undergraduates (45 men and 45 women). The interrelation of these measures as well as the effect of sex, age, and social class on comprehension of principled moral judgments were investigated.

Formal operations and social class contributed significantly to P score variance on Rest's Defining Issues Test while Constantinople's ego measure did not relate to any of the variables in the regression analyses. The identity questioners as assigned by the Marcia interview scored significantly higher ($p < .05$) than the non-questioners on formal operations, but scored no higher on the Constantinople Inventory of Personality Development or Rest's principled morality measure.

Looking at the highest stage of substantial usage on Rest's Defining Issues Test suggested movement from Stage 5A to Stage 5B in principled morality is accompanied by increased ego development (Constantinople) without increased formal operations capability. Validity studies of the ego measures as well as cross-sectional and longitudinal studies of the interrelation of formal operations, principled morality, and ego development were recommended.

ACKNOWLEDGMENTS

To Dr. Maurine A. Fry, Chairman of my committee, for making the dissertation preparation process a truly stimulating, pleasurable, and memorable growth experience.

To Donald L. Cauble, my husband, for his invaluable technical assistance with the Piagetian apparatus and the countless episodes of patience, assistance, and encouragement when they were greatly needed.

To Judith Creighton, my cohort, for volunteering to interview the entire sample using the Marcia measure.

To my children during their visits home, for their understanding, patience, and willingness to accept deviations from the status quo during the dissertation preparation process.

M. A. C.

TABLE OF CONTENTS

Chapter		Page
I.	Rationale	1
II.	Review of Literature	7
	Three Theoretical Positions Involved	7
	Piaget: Cognitive Development	7
	Erikson: Psychosocial Development	13
	Kohlberg: Moral Development	20
	Empirical Studies Relating Cognitive, Psychosocial, and Moral Development	28
	Relating Cognitive to Moral Development	28
	Relating Ego Identity to Cognitive Development	31
	Relating Ego Identity to Moral Development	33
	Relating Ego Identity, Cognitive, and Moral Development	37
	Summary of Implications from the Theories and Empirical Studies	40
III.	Method	44
	Subjects	44
	Instruments	48

Chapter Page

IV. Results 58

V. Discussion 75

Reference Notes 87

References 90

Appendix A 98

Appendix B 100

Appendix C 110

LIST OF TABLES

Table		Page
1	Distributions of Chronological Age, Social Class Level, and College Year in the Sample by Sex	47
2	College Majors of Sample by Sex	49
3	Means, Standard Deviations, and Ranges of Five Variables Used in the Multiple Regression Analyses	59
4	Intercorrelations Among Four Variables in the First Multiple Regression Analysis	60
5	Multiple Regression Analysis for Piagetian Tasks, Constantinople IPD Measure, and DIT Principled Morality Responses	62
6	Intercorrelations Among Five Variables Included in the Second Multiple Regression Analysis	64
7	Summary of Analysis of Variance of Constantinople IPD as a Function of Dichotomized Piagetian Task Total Scores	66
8	Summary of Analysis of Variance of Piagetian Task Total Scores as a Function of MSI Identity Categories	67

Table		Page
9	Summary of Analysis of Variance of DIT Total Scores as a Function of MSI Identity Categories	69
10	Summary of Analysis of Variance of IPD Total Score as a Function of MSI Identity Categories	70
11	DIT Means and Standard Deviations as a Function of Quartiled Piagetian Task Scores	71
12	Piagetian Task and IPD Means and Standard Deviations as a Function of Highest Substantial Usage Stage of the DIT	73

LIST OF FIGURES

Figure		Page
1	Flexibility of rods apparatus	101
2	Oscillation of the pendulum apparatus	106
3	Equilibrium in the balance apparatus	108

CHAPTER I

Rationale

Cognitive ability may mediate development in other areas, particularly moral development. The Piagetian level of formal operations appears to be a necessary, but not sufficient condition for attaining Kohlberg's level of principled morality (Tomlinson-Keasey & Keasey, 1974). Could an intervening identity crisis provide an additional condition necessary for attaining Kohlberg's level of principled morality? This was the guiding question of the present study.

Kohlberg and Gilligan (1971) hypothesized, but did not test, the notion that movement to the principled level of morality required formal operations and their use not only in the questioning of conventional morality, but also in the questioning of one's self, one's occupational plans, and one's ideological stance. Using Marcia's (1964) identity status interview, Podd (1970) provided some support

XUM

for the relation between identity achievement and principled moral reasoning. Podd found that college men who were identity achievers made greater use of principled moral reasoning than did college men who were classified in the moratorium, foreclosure, or diffusion status. Turiel (1974) also found indirect support for a sequence of movement from formal operations to conventional morality and self-identity questioning. His college students who were in transition from the conventional to principled levels of morality expressed conflict over conventional morals and social-conventional norms. Descriptions of these conflicts closely resembled those of adolescents in the throes of an Eriksonian identity crisis.

Investigation of how formal operations, ego development, and principled morality might relate and sequence would provide an initial integration of the three major developmental theories of Piaget, Erikson, and Kohlberg. Positive findings would justify a longitudinal study, since only such a study could provide convincing evidence for the hypothesized sequence.

The primary objective of this study was to take the first step. That is, the purpose was to assess the relative contribution of formal operations and ego development to the principled moral reasoning of college males and females.

The dependent variable in the present study was moral judgment as assessed by Rest's (Note 1) Defining Issues Test. This paper-and-pencil test incorporates Kohlberg's moral levels and dilemmas. However, instead of assessing spontaneous reasoning as does Kohlberg's interview approach, the Defining Issues Test measures judgments about stated moral judgments regarding the dilemmas. Results are presented in the form of a P score that represents the relative importance a subject gives to principled considerations.

The independent or classification variables in the study were socio-economic status, sex, level of cognitive development, level of ego development, and identity status.

Hollingshead's (Note 2) Two Factor Index of Social Position was used as a measure of social class. Assignment to one of five social class levels was made on the basis of the father's level of education and occupation.

Cognitive level was assessed by three Piagetian formal thought tasks: flexibility of rods, oscillation of the pendulum, and equilibrium in the balance. The first two tasks required the subject to provide proof of hypotheses by experimentally varying each variable while holding the remaining variables constant and noting the effects. The third task required the subject to discover relations of direct and inverse proportionality and to understand reciprocity in physical systems. The students were asked a structured sequence of questions each of which required a formal operations response to pass. A total score was obtained by summing across all items.

The independent variable of ego development was operationalized in two ways. The Constantinople (Note 3) Inventory of Personality Development was used because it presents an overall assessment of characteristics reflecting successful and unsuccessful resolutions of Erikson's first six stages of psychosocial development.

Ego development was also evaluated by the Marcia (1964) identity status interview. This measure categorizes the individual's responses about his decision-making crises and

commitments regarding occupation, religion, and politics. The requirements for categorization of a subject to a status are: (a) identity achievement, completion of a decision-making crisis and subsequent commitment; (b) moratorium, presently in crisis with some or vague commitment; (c) foreclosure, has experienced no crisis but committed to goals and values of parents or significant others; (d) identity diffusion, no commitment regardless of crisis. In the present study, subjects were assigned to one of the four categories based upon the modal category assignment of two or three judges.

Thus, the hypotheses of the study are:

1. Scores obtained on measures of formal operations, ego development, and principled morality are all positively correlated.
2. This relation is greater for males than for females.
3. In a multiple-regression analysis with principled morality as the criterion variable, ego development makes a contribution to explaining variance not accounted for by formal operations performance.

4. Individuals above the median on formal operations obtain higher scores on the Inventory of Personality Development than those below the median.
5. Blocking on Marcia's identity status measure reveals a significantly higher level of cognitive functioning on the Piagetian tasks among those who have questioned their identity than among those who have not.
6. Blocking on the Marcia identity status measure reveals a significantly higher level of principled morality among those who have questioned their identity (identity achievement and moratorium) than among those who have not (foreclosure and identity diffusion).

CHAPTER II

Review of Literature

The following review of the literature is divided in two sections: (a) a brief sketch of the three theoretical positions involved in the study, and (b) empirical studies relating cognitive, psychosocial, and moral development.

Three Theoretical Positions Involved

A brief sketch of the theoretical positions of Piaget, Erikson, and Kohlberg is presented to further clarify the integration of their constructs in the present study.

Piaget: Cognitive Development

Piaget views equilibration, the attainment of equilibrium states, as an internal self-regulating system using assimilation and accommodation processes to reconcile the rules of maturation, experience, and social interaction. The successive, hierarchical, heterogeneous equilibrium

states are the organized systems of actions. In each of these psychological equilibrium states there is variation in field of application, mobility, permanence, and stability as advancement is made along and within the hierarchy.

In focusing upon equilibrium states or stages, Piaget refers to an equilibrated system of relations between subject and object as well as the relation between assimilation and accommodation. This delineation follows from his position that there are two aspects to structure formation, the cognitive and the affective. The construction of objects is referred to as the formation of cognitive structures, while the development of affectivity is referred to as the object relationship (Flavell, 1963).

Decentration, responding to the elements of a situation with simultaneous and proportionate operation of assimilation and accommodation, stimulates the development of new forms of equilibrium. The principle is that the child begins any operation in terms of centration. For example, in the initial sensori-motor period, for object permanence to occur, decentration from the self must take place. As each process of decentration occurs, with each succeedingly

higher equilibrium state, the child moves from one focus to another: i.e., from the self (sensori-motor), to immediate realities (concrete operations), to abstract conceptualizations (formal operations). With each succeeding equilibrium state, a greater capacity for dealing with physical and social realities, and subsequent thinking and judgment emerges (Piaget & Inhelder, 1966/1969).

Within Piaget's hypothesized sequence, the development of concrete operations and formal operations are most pertinent to the present study.

Concrete operations. Cross-culturally the child of approximately six to eight years begins to deal in operations that are "concrete" (Goodnow, 1962). These operations relate directly to objects and not yet to verbally stated hypotheses. Operations, such as the union of two classes, that feature generality and reversibility are already coordinated into overall structures including classifications, seriations, and correspondences, from one to one or one to several. However, only step-by-step reasoning is possible (Piaget & Inhelder, 1966/1969).

Although Piaget's primary emphasis is cognitive, his early study of the child's moral judgment via rules in games of marbles, resolutions of dilemmas, and the process of telling lies led to some attention to social and moral decentering that he assigned to the affective domain. Affectivity, initially centered on various aspects of family relations, gradually widens its scope depending upon the social radius of the child involved. Social exchanges permit the child to move from a state of relative lack of coordination or differentiation between his own view and those of others to the coordination of points of view and cooperation in action and communication (Piaget, 1950/1968). With the capability of cooperating with others comes not only increased consciousness of the self (Meyer, Note 4), but movement to new moral relationships based upon respect and reciprocity that lead to a certain autonomy of moral judgments. The operatory child regards rules as the result of agreement among contemporaries. He accepts the idea that rules can be changed by democratically arrived at consensus (Piaget & Inhelder, 1966/1969). In contrast, the pre-operatory child incorporates the rules ready-made from

parents by way of heteronomy or morality of obedience derived from unilateral respect (Piaget, 1932/1965).

Formal operations. Formal operations may gradually develop at about age 12. The formal system is independent of and detached from the specific reality it organizes. This liberation from content of the formal mechanisms leads the child to superimpose on the elementary operations a new system of operations on operations, or propositional operations. The new system involves synthesis, not just a juxtaposition of inversions and reciprocities--an operatory fusion into a whole. An exemplar of the system in operation is the equilibrium in the balance task that requires the subject to understand the scheme of proportionality.

The most important general property of formal operations is the ability to reason from the possible to the real. The adolescent considers the problem at hand by trying to see all the possible relations that could hold true in the data and then tries, through a combination of experimentation and logical analysis, to find out which of these possible relations in fact does hold true. Piaget's oscillation of the pendulum and flexibility of the rods tasks require

isolation of the relevant and irrelevant variables and exclusion of the latter.

The moral autonomy that became evident on the interpersonal level during the period of concrete operations acquires, with formal operations, an added dimension in the application of ideal or supra-individual values. At this time the concepts of social justice and of rational, aesthetic, or social ideals aid in the creation of ideas and the formation of values related to plans for the future (Piaget & Inhelder, 1966/1969).

Horizontal decalage. In conjunction with Piagetian theory and the present study, consideration must be given to the concept of horizontal decalage or differentials. The latter refers to the lack of a strong relation among Piagetian tasks involving the same mental operations. Only moderate correlations have been obtained at the levels of concrete operations and formal operations (Lovell, Note 5). Piaget (1971) interpreted horizontal decalage as the greater difficulty in serializing, equalizing, etc., in some situations as a function of their greater abstractive properties or associations. Flavell and Wohlwill (1969) presented an

additional interpretation of horizontal decalage or differentials. They interpret that decalage is a result of the differential rates in the formation of the structures themselves.

In a developmental study, Miller, Kessel, and Flavell (1970) found that understanding of the recursive or self-embedded nature of thinking increased with age. Flavell, Botkin, Fry, Wright, and Jarvis (1968) found indications that recursive interpersonal thinking did not become common until adolescence when much attention is given to gauging thoughts and feelings of significant others toward oneself. Based on these data, combined with the concept of horizontal decalage, I am hypothesizing that decentering is difficult when applied to one's feelings about the self and significant others. This difficulty tends to produce a time lag in ego development in contrast to performance on traditional Piagetian cognitive tasks.

Erikson: Psychosocial Development

Erikson (1968) borrowed the principle of epigenesis from biology to explain his theory. "Anything that grows has a ground plan, . . . out of this ground plan the parts

arise, each part having its time of special ascendancy, until all parts have arisen to form a functioning whole" (p. 92). For Erikson, normal personality development has a direct relation to physical growth which provides the organism with progressively more differentiated individual capacities. With the more highly developed sense modalities, intellect, and physical capacities that accompany advancing age, the individual is faced with an expanding radius of social contacts that lead to opportunities as well as limitations imposed by the culture.

Each of Erikson's steps or crisis periods in development from infancy through adolescence is related to the increasing radius of the individual's psychosocial relationships. The order of this expansion is relatively uniform from one culture to another. Thus, the first social or interpersonal contact of the infant is with the mother or mother-figure. The subsequent steps in expansion of the social radius include the immediate family, the play group, teachers and other significant adults; and finally, cliques, social prototypes, and heterosexual pairings (Erikson, 1968).

XUM

Each of the steps or stages exists in some rudimentary form before it becomes phase-specific, but societal pressures and the child's developing capacity to interact with the pressures combine to precipitate each psychosocial crisis and mode of functioning. By the conclusion of each crisis period, the component of personality that is related to that specific psychosocial stage will have become developed or structured in a more or less lasting form. The healthy adult personality is predicated upon the successful (predominately positive) resolution of eight specific psychosocial crises, covering a time span from infancy through mature adulthood. Each of the psychosocial crises must be resolved before one can move effectively forward to the next stage. In a way, Erikson's theory is pyramidal and hierarchical: the successful solution of each crisis is dependent upon the positive resolution of the preceding crisis. The unsuccessful resolution of any given stage renders the resolution of subsequent crises more difficult with the weakness in one or more stages reflected in the mature personality (Erikson, 1950/1963). This bipolar description of each stage seems to presume that solutions are normally

distributed along a continuum. Few members in the population are at either extreme. Most people fall toward the middle. For example, although they may vacillate from time to time and person to person in the degree to which they trust, they will exhibit a general tendency to be trusting (McCandless, 1970).

Specific crisis periods. During infancy the psychosocial crisis develops out of the relationship of mother-figure and infant. Basic trust develops from the positive resolution of this normative crisis. Unsuccessful resolution leads to development of a sense of basic mistrust.

The early childhood psychosocial crisis requires the child to meet with success in establishing relations with powerful persons that permits the development of a sense of personal autonomy. When this early crisis is not resolved in a healthy manner, it leads to the development of shame and doubt.

The third psychosocial crisis occurs during the play age when the child must work through the conflicts engendered in establishing identifications with the parent of the opposite sex and learning techniques of play with peers. The

XUM

criterion of a successful solution is the development of initiative.

During the elementary school years, the child's normal psychosocial experiences permit him to develop the sense of achievement that comes with work identity. When a sound work identity does not develop for any number of reasons, as when unrealistic demands are made upon the child, a deep sense of personal inadequacy and fear of competition will develop. The criterion of ill-health for the school-age crisis is a sense of personal inferiority. The positive and negative derivatives of this period are, respectively, an anticipation of personal achievement and work paralysis.

The fifth psychosocial crisis arises during adolescence. Because entrance into adult society as an equal is imminent, and major maturational changes are concomitantly occurring, the adolescent's previous trust in his body and his mastery of its functions are suddenly shaken and must be regained gradually by re-evaluating himself.

American society has provided the adolescent a socially authorized delay of adulthood, a psychosocial moratorium, to accomplish this task of self-re-evaluation. For middle-

class youth in the United States, the moratorium tends to occur during the college years. This period provides the opportunity to work on the seven areas which represent a partial polarization of crises of the developmental continuum: (a) developing a sense of time that permits him to see his life in a definite perspective so that he can develop a satisfying life plan (trust in time), (b) gaining a certainty of self while losing much of the self-consciousness so evident in adolescence (autonomy), (c) successfully experimenting with a wide range of roles to permit selection with the most appropriate one for life (initiative), (d) bringing his sense of industry to bear in a persistent pattern in preparation for that goal, (e) resolving his bisexual conflicts of identification with his own sex role while experiencing comfort in his range of contacts with members of the opposite sex (intimacy), (f) realistically appraising authority in society and displaying a readiness to be in authority if called upon (generativity), and (g) selecting a basic philosophy, ideology, or religion (integrity).

If the moratorium fails, the adolescent either defines himself too early and commits himself to adult society before

he is ready--identity foreclosure, or he has strong feelings of failure at being left to the danger of the stage's crisis and finds himself at a loss as a person. He does not know what he wants to be or who he really is in the eyes of others--identity diffusion.

If the moratorium is successful, the adolescent attains a sense of identity. He finds his "fidelity," a progressive continuity between what he has become and what he promises to become in the anticipated future (Erikson, 1968).

The following sixth stage involves the crisis of intimacy, a counterpointing as well as a fusing of identities, versus isolation, the incapacity to take chances with one's identity by sharing true intimacy. The seventh stage produces the crisis of generativity, the concern for establishing and guiding the next generation, versus self-absorption and interpersonal impoverishment. The final eighth stage brings the crisis of integrity, the acceptance of one's life cycle and of the people who have become significant to it as something that had to be. The alternative to this resolution is despair, a feeling that time is too short for the attempt to start another life and to try out alternate roads to

integrity. With the exception of the crisis of intimacy, these later stages are of no particular concern to the present study.

Kohlberg: Moral Development

Kohlberg's (1958) scheme of moral development incorporates aspects of Piaget's conception. Most of the elements described by Piaget as heteronomous and autonomous morality respectively are incorporated in Kohlberg's scheme as Stages 1 and 2. Kohlberg's three-level, six-stage scheme of moral reasoning is more elaborate than Piaget's and follows the development of the child well beyond preadolescence.

Kohlberg hypothesized an invariant sequence of stages in moral development. The attainment of one stage depends upon the attainment of the preceding stage and requires a reorganization of the earlier mode of thought. Each of the six stages is defined by some 25 basic aspects of moral judgment. A brief description of each stage's view of the value of human life is interspersed through the following discussion:

Level I: Premoral or Heteronomous Level

Stage 1: No differentiation between moral value of life and its physical or social-status value.

Where Piaget assumes Stage 1 morality reflects a deep reverence for the adult "World Order," Kohlberg (1963) characterized the Stage 1 child as having a realistic-hedonistic desire to avoid punishment.

Stage 2: The value of a human life is seen as instrumental to the satisfaction of the needs of its possessor or of other persons. Decision to save life is relative to, or to be made by, its possessor. (Differentiation of physical and interest value of life, differentiation of its value to self and to other.)

Piaget concludes that Stage 2 is due to direct teaching by others. Kohlberg (1963) interprets Stage 2 as reflecting cognitive differentiation and firm internal basis of judgments. The individual has increasing awareness of his own ego-interests and of the exchange of ego-interests underlying much of social organization.

Level II: Conventional Level

Stage 3: The value of a human life is based on the empathy and affection of family members and others toward its possessor. (The value of human life, as based on social sharing, community, and love is differentiated

from the instrumental and hedonistic value of life applicable also to animals.)

Stage 4: Life is conceived as sacred in terms of its place in a categorical moral or religious order of rights and duties. (The value of human life, as a categorical member of a moral order, is differentiated from its value to specific other people in the family, etc. Value of life is still partly dependent upon serving the group, the state, God, however.)

Level III: Postconventional or Principled Level

Stage 5: Life is valued both in terms of its relation to community welfare and in terms of being a universal human right. (Obligation to respect the basic right to life is differentiated from generalized respect for the socio-moral order. The general value of the independent human life is a primary autonomous value not dependent upon other values.)

Stage 6: Belief in the sacredness of human life as representing a universal human value of respect for the individual. (The moral value of a human being, as an object of moral principle, is differentiated from a formal recognition of his rights.) (Kohlberg, 1971, pp. 168-169)

Kohlberg and Piaget gather data by asking subjects to respond to hypothetical stories that raise moral judgment

issues and to explain and justify their views. Piaget's use of stories is a more focused data-gathering procedure than Kohlberg's. A set of contrasting Piagetian stories is designed to highlight one aspect of moral judgment. Questioning of the subject places him in a forced-choice situation that permits the experimenter to elicit information regarding the subject's objective or subjective responsibility. When Cowan, Langer, Heavenrich, and Nathanson (1969) compared these judgment data with explanations the subjects were required to give in justification of their choices, the two sources of data were very closely related (r = .87).

Kohlberg presents a single story to his subjects, raising a dilemma in which an actor has two positive or two negative choices of action. His method of data-gathering is much more open-ended than Piaget's, and the method of characterizing a subject's thought is much more complex. A subject may choose to discuss any of 25 aspects of Kohlberg's multi-faceted stories when he responds in the interview. Kohlberg does not set up his dilemmas with a specific scoring characteristic in mind as does Piaget. As a result, categorizing the free responses requires highly trained scorers.

In a longitudinal study, Kohlberg and Kramer (1969), found that principled morality of the Stage 5 variety can be almost completely developed by the end of high school. They concluded that Stage 5 principled morality is born in adolescence, but Stage 6 morality tends not to become crystallized until the early twenties. The major change in moral thought past high school was a significant increase or stabilization of conventional morality at the expense of preconventional stages of thought. Age groups as a whole reflected stabilization of moral thought, but considerable individual variability in stage usage still existed.

Kohlberg and Kramer (1969) also found that between late high school and the second or third year of college, 20% of the middle-class sample dropped in moral maturity scores. This 20% was among the highest group in high school, was the lowest in college, and again was among the highest at age 25. The correlation of moral maturity scores at age 16 with scores at age 25 was .80 while the correlation from high school to college and college to 25 years was .41. Kohlberg explained this finding as temporary regression, in "service of the ego," caused by the pressures of college life.

An interesting finding in studies by Kohlberg and Kramer (1969) and Holstein (1969) was that as girls moved beyond high school, many remained at Stage 3 moral reasoning, while male age-mates drop Stage 3 in favor of stages above it. In contrast, Cooper (1972) used Rest's (Note 1) objective measure of Kohlberg's scheme with a high school group and found females received slightly higher principled morality scores than males.

While both Piaget and Kohlberg's procedures seek to assess the subject's own spontaneous view as a measure of his moral reasoning, Rest, Turiel, and Kohlberg (1969) asked fifth- and eighth-graders to make judgments about other moral judgments and then measured comprehension of and preference for judgment statements. They found that the spontaneous production, comprehension, and preference tasks assessed different levels of acquisition of an idea. Subjects could recognize and discriminate and thus prefer an idea before they could paraphrase it or before they could spontaneously produce the idea in response to a story dilemma. Rest (1973) found that many of his 47 subjects fully comprehended statements at higher stages than the

predominant stages that they spontaneously used on the Kohlberg free-response interview. In addition, most subjects preferred statements at stages higher than those used or comprehended. The developmental hierarchy, in ascending order of difficulty, appeared to be preference, comprehension, and spontaneous use.

Recently Rest (Rest, Cooper, Coder, Masanz, & Anderson, 1974) introduced an objective measure of moral reasoning, reflecting the preceding work (Rest, Turiel, & Kohlberg, 1969; Rest, 1973). Rest's Defining Issues Test, used as the moral reasoning measure in the present study, correlated .68 with scores on the Kohlberg interview. The Defining Issues Test correlated .62 with age and .42 with the IQ Quick Test for Adults. In addition, the test appeared to be more sensitive to gains in moral thinking than complexity of thinking in general. In a study involving an ethics and a logic class, both classes received the Defining Issues Test as a pretest. After a 12-week interval, a posttest was given to both classes. The students in the ethics class scored significantly higher on the posttest than the pretest, and their gain scores were significantly higher than those of the logic class students (Rest, Note 6).

In conjunction with the development of the Defining Issues Test, Rest (1974) elaborated upon Kohlberg's scheme of Stages 5 and 6. Rest indicated that the principled moral thinker subsumes the concept of reciprocity to the need for social structure and stabilized expectations among men. The principled moral thinker realizes that societies and social relationships can be arranged in many possible ways with each way having its advantages and disadvantages. Therefore, the principled moral thinker needs a rationale for selecting among the possibilities. Stage 5A appeals to those goals which the constituency itself has agreed upon through the democratic decision-making process. Stage 5B appeals to intuitively attractive group ideals of love, peace, the Classless Society, and Liberty-Equality-Fraternity. Stage 6 appeals to those organizing principles that optimize cooperation among rational and equal people.

Turiel (1974) studied college students who were in transition between Stages 4 and 5 of moral reasoning. Kohlberg's moral dilemma interview and a social-conventional norm dilemma were used as dependent measures. Turiel found great inconsistency in the moral responses he received. He

XUM

interpreted the inconsistency as disequilibrium due to the student's recognition of his cognitive inadequacy to deal with the problems. His thesis was that the disequilibrium stimulated the students to move to the principled level of morality.

Empirical Studies Relating Cognitive, Psychosocial, and Moral Development

Studies that, in varying degrees, related cognitive, psychosocial, and moral development are presented in the following literature review. A review of these studies, their points of convergence, and their contributions to the rationale of the present study are included.

Relating Cognitive to Moral Development

There is a surprising paucity of research on the relation between cognitive and moral development. Kohlberg (1958) cited a correlation of .31 between IQ scores and moral judgment when the IQ scores were dichotomized at 100. Lambert (1972) found a similar correlation between Kohlberg's moral reasoning and IQ scores as measured by the Otis Test of Primary Mental Abilities. Kuhn, Langer, and Kohlberg

used the Piagetian pendulum task to test the assumed relation between formal operations and moral judgment, but only selected aspects of the unpublished data are available from Kohlberg and Gilligan (1971). Of 265 persons from 10 to 50 years of age, the percentage showing clear formal operations ranged from 45 to 65. Studies by Lovell (1961) and Tomlinson-Keasey (1972) agreed with these findings. Only 10% of those over age 16 in the Kuhn, Langer, and Kohlberg sample attained formal operations and also demonstrated principled morality. A correspondence was found between Piaget's logical and Kohlberg's moral reasoning stages: Kohlberg's Stages 1 and 2 developed sequentially with Piaget's pre-operations and Stages 5 and 6 with formal operations.

Lee (1971) studied the relation between cognitive and moral development in 195 boys ages 5 through 17. She used Piagetian tasks to assess logical thought and Piaget's conflict-type stories to measure levels of moral judgment. A Pearson r of .60 between formal operations and socially oriented responses to moral conflict stories was obtained.

Tomlinson-Keasey and Keasey (1974) used the Piagetian pendulum, balance, and rods to measure cognitive level, and

XUM

a questionnaire form presenting six Kohlberg dilemmas (1958) to measure moral judgment. The sample consisted of college coeds (N = 24) and sixth-grade girls (N = 30). The product moment correlation between formal operations and principled morality was .58 for the coeds and .60 for the sixth-grade girls. When the samples were classified by cognitive level, their mean moral judgment scores differed significantly. Further analysis of cell frequencies generally supported the hypothesis that formal operations were necessary for the development of principled moral reasoning. However, not all students who attained formal operations functioned at the principled morality level. Of the eight coeds at the integrated formal thought level (demonstrated formal operations on all three Piagetian tasks), only three responded at the level of principled moral reasoning more than half the time. For the girls, the data showed transition to formal operations was accompanied in the moral realm by a transition, not to principled, but to conventional moral reasoning. Explanations of the latter findings centered on lack of generalization from physical to social areas or lack of experience in the area of morality. Support for

the latter position was found in the studies of Kohlberg (1969), and Tomlinson-Keasey and Keasey (1972) wherein opportunities for and skills used in social interplay affected the course of moral development.

In sum, Lee (1971) and Tomlinson-Keasey and Keasey (1974) found a positive relation between formal operations and conventional morality. Tomlinson-Keasey and Keasey's (1974) coeds who demonstrated integrated formal operations were at the principled morality level in 38% of the cases, a higher percentage than the 10% of the Kuhn, Langer, and Kohlberg study of both sexes.

Relating Ego Identity to Cognitive Development

No studies were found that explored the relation between ego identity and cognitive development as measured by Piaget's tasks. However, the following studies suggested a relation between Erikson's construct of ego identity and various other cognitive tasks.

Using a semistructured interview with 86 college males of ages 18 to 21, Marcia (1964) delineated four modes of reacting to the late adolescent identity crisis. The criteria for inclusion in one of the four identity modes were

presence of crisis and commitment in occupation and ideology (political and religious). The identity achievement status required completion of decision-making crisis and subsequent commitment. Foreclosure status required no crisis experience but commitment to occupation and ideology with the latter often coinciding with parents' views. Moratorium status included those presently in crisis with some or vague commitment. Identity diffusion status included students who demonstrated no commitment regardless of crisis. The Marcia measure showed a relation with performance on a concept attainment task (Bruner, Goodnow, & Austin, 1956, as modified by Weick, 1962).

Marcia and Friedman (1970) tested Marcia's identity status construct with 49 senior college women. A significant relation (r = .42) was found between difficulty of college major (ranked by 160 college women) and performance on Luchin's Water Jars problems. No significant differences were found using the Marcia measure and the Water Jars problems. Neither were there any significant differences between the Marcia measure and a 40-item vocabulary recognition section of the Shipley-Hartford Scale used as an intelligence measure.

Van den Daele (1968) studied ego ideal development in males and females (N = 108) from 8 to 18 years of age. He found IQ scores were increasingly correlated with ego ideal level with advancing age for both sexes.

The evidence presented thus far regarding the relation of ego identity to cognitive development is based upon studies in which either one or both constructs were not developed to represent Piaget's or Erikson's theory. Both sexes are used in only one study and, overall, the findings are equivocal. Using the traditional Piagetian tasks and Eriksonian identity measures should provide a better test of this relation.

Relating Ego Identity to Moral Development

A number of studies have related aspects of ego identity to moral development. All studies presented use Kohlberg's scheme of moral development. The ego identity construct was represented by Marcia's (1964) interview and Loevinger's (1966) ego development scale.

Podd (1970) used Marcia's interview to assign 134 college males to an identity status and to look at the modal and mean morality level scores obtained within each status. Using modal morality level, Podd found that identity

XUM

achievers showed a significantly greater tendency to use principled moral reasoning than did other identity status students, while identity diffusion students showed a greater tendency to use preconventional moral reasoning than students in any other status. However, almost as many of the identity achievers used conventional moral reasoning (N = 18) as principled moral reasoning (N = 21). Moratorium students revealed a comparable distribution of these moral reasoning levels (N = 5 for each level). Using the students' mean morality scores, Podd found identity achievement and moratorium students obtained significantly higher scores than foreclosures, while identity diffusion students received significantly lower scores than moratorium students.

Lambert (1972) used a sample of subjects (N = 107), ranging in age from 11 to 60, to study the sequential relation between Loevinger's model of ego development and Kohlberg's model of moral judgment. Loevinger's (1966) hierarchical model is a hypothetical construct referring to an individual's relatively stable "frame of reference." This model postulates that each individual has a customary orientation to himself and the world or, in other words, a

customary method of approaching problems. Loevinger delineated seven stages ranging from presocial symbiotic, to impulse ridden, opportunistic, conformist, conscientious, autonomous, and finally integrated. Lambert developed a contingency table that indicated a striking correspondence between Loevinger's and Kohlberg's pure stages. Upon appraisal of the subjects' ego transition-stage scores, Lambert concluded that movement from conventional morality to transitional principled morality is a momentous one for ego development. Once the authority and social-order oriented individual begins to recognize that there is an arbitrary element in rules or social expectations, he has laid the groundwork for qualitatively more advanced levels of ego functioning. In addition, subjects who seem to have stopped progressing at the transitional principled morality stage are about as likely as more morally advanced subjects to reach the higher "autonomous" and "integrated" levels of ego development.

Lambert explored the sentences written by his subjects to determine which aspects of ego development mature before moral development. He found that subjects moving to

principled morality (a) showed increasing awareness of the inner life of other people, (b) actively valued interpersonal interactions, (c) were better able to conceptualize more alternatives than subjects at the preceding stage of development, (d) showed greater concern for coping with life and reality, (e) showed an increasing awareness of their own individuality, (f) were interested in roles as avenues for personal achievement, (g) were beginning to show an awareness that only through themselves do people achieve self-fulfillment and individuality, (h) showed an increasing awareness of their own individuality.

Turiel's (1974) study of late high school and college undergraduates in the transitional stage between conventional and principled morality indirectly indicates a positive relation between moral questioning and identity crisis. Turiel used Kohlberg's (1958) dilemmas and his own social-conventional thinking stories. These late adolescents showed conflict and confusion regarding their own inconsistency in reasoning within and among moral, social-conventional, individual, and societal issues.

Viewing the preceding studies conjointly, the implication is strong that relativistic questioning of conventional morality and social-conventional norms and not the actual attainment of principled morality is necessary for attainment of full ego maturity or a sense of identity. The suggestion prevails that this questioning permits taking a relativistic view of self and society and then making a decision to uphold a conventional or a principled morality viewpoint, and proceed through the future Eriksonian stages of intimacy, generativity, and integrity. The necessity of an underlying level of formal operations has been empirically evidenced for principled moral reasoning but not for the attainment of a sense of identity. For the latter, the theoretical perspectives of Piaget and Erikson are as yet not tested.

Relating Ego Identity, Cognitive, and Moral Development

Two studies were found that interrelate the triad of ego, cognitive, and moral constructs. These studies incorporated Kohlberg's moral reasoning and Loevinger's ego development. For cognitive development, one study used a

"conceptual-systems" viewpoint and the other an intelligence measure. Neither study involved college students.

Sullivan, McCullough, and Stager (1970) made a comparative analysis of ego (Loevinger, 1966), "conceptual systems" (Harvey, Hunt, & Schroder, 1961; Hunt, 1966), and moral judgment (Kohlberg, 1958) using 120 subjects, 20 males and 20 females each at ages 12, 14, and 17.

The extent to which scores increased with age was represented by the correlations with age of .66, .65, and .65 for the moral, ego, and conceptual level scores, respectively. Therefore, the study replicated previous findings regarding moral judgment and "conceptual systems," and provided an initial indication that ego development is a phenomenon that follows age parameters. A prediction of moderate positive relatedness between scales was confirmed by the partial correlations for all 120 subjects (in parentheses with age variable eliminated): between moral and ego development, .66 (.40); between moral and conceptual level, .62 (.34); and between ego and conceptual level, .56 (.23).

Van den Daele (1968) studied males and females from the second- through twelfth-grades (N = 108) in an attempt to describe the principles by which the individual selects his ego ideal as a function of age. Ego ideal was defined as "Those objectives, states of being, or ways of behaving whose attainment the person considers as important to his self-definition or self-evaluation" (p. 244). Erikson (1968) sees the ego ideal as close to the ego function of reality testing.

Correlational analysis of the dependent variables by age and sex, for intelligence and socio-economic status revealed intelligence increasingly associated with ego ideal level as a function of age for both sexes. However, intelligence was not correlated with moral judgment for males, but correlated for females in the older age group. Collapsing across age and sex the correlation between ego ideal level and moral judgment level was .67.

The triad of moderate to high correlations among intelligence, moral development, and ego ideal level for females suggests a psychological interdependence among these systems. Conversely the negative relation between intelligence and

moral judgment and the low correlation between ego ideal level and moral judgment suggest a psychological compartmentalization among these systems for males. Van den Daele concluded that achievement appears to be more important for males than the morality of achievement. Moral judgment, including morality in social relations, is more important to feminine identity.

The two studies reviewed suggest a positive relation among the triad of cognitive, moral, and psychosocial constructs. The Van den Daele study repeated the implicit suggestion of Kohlberg and Kramer (1969) and Holstein (1969) to observe sex differences in the interrelation. Lambert's (1972) data indicated that one may make a cognitive decision to incorporate conventional or principled morality as a mode of functioning, and that ego development then progresses beyond either decision.

Summary of Implications from the Theories and Empirical Studies

Piaget and Kohlberg assume the parallel growth of cognitive and affective structures. Their emphasis on cognitive structures requires a positive relation among the cognitive,

moral, and ego constructs. Erikson implied a positive relation when he outlined the need for formal operations for a young person to re-evaluate and synthesize his lifetime identifications and make them consonant with societal demands before he could attain a positive sense of identity. The identity crisis requires an adolescent to bring into agreement the ethical as well as the social and personal aspects of his life. Positive resolution of the crisis is reflected in healthy personality development.

Empirical evidence for the positive interrelation of the three constructs of the study was limited to studies in which two of the three constructs involved were not identical with the constructs used in the present study (Sullivan et al., 1970; Van den Daele, 1968). Erikson's theoretical formulations and empirical studies suggested there may be sex differences in the interrelation of cognitive, moral and identity constructs (Holstein, 1969; Kohlberg & Kramer, 1969; Van den Daele, 1968).

In considering the various pairwise construct relations, the Piagetian and Kohlbergian hypotheses and the empirical confirmations indicated a positive relation between moral

and cognitive development which provided impetus for the present study.

The relation between Erikson ego development and Piagetian cognitive development lacks empirical testing. However, Piaget, Erikson, and Kohlberg specifically subscribed to a positive relation between formal operations and adolescent identity tasks.

Piaget attested to a relation between moral and ego development by assigning both to the same affective domain. Erikson concurred by indicating that identity and ideology were two aspects of the same system. Kohlberg underplayed the affective domain similarities of moral judgment and ego identity by referring to moral and logical development as transformations in organization of thought and to Erikson's ego identity as content, not amenable to comparison with the former constructs. However, he posited a positive relation between principled morality and identity achievement that Podd's (1970) study tended to confirm. A Piagetian cognitive measure was not included in any of these studies, but a cognitive interpretation was presented on the basis of the inclusion of the moral judgment measure. While Kohlberg

posits a positive relation between principled morality and identity achievement, Lambert (1972) and Podd (1970) indicated identity achievement occurred with either conventional or principled morality students.

In sum, the various theoretical formulations and empirical study confirm the need for a test of the centrality of formal operations to ego development and principled morality within the same sample of subjects. The present study explored the moral and ego development relation and permitted partialling out the formal operations component to test the hypothesis.

CHAPTER III

Method

Subjects

Approximately 300 college students in six upper division classes at Arizona State University agreed to participate in the present study. Three hundred packets were prepared that consisted of a biographical data sheet and four sealed manila envelopes. The four manila envelopes contained (a) a Defining Issues Test, (b) an Inventory of Personality Development, (c) a scoring sheet for the Piagetian tasks, and (d) a copy of the questions for the Marcia interview. An identification number rather than a name was printed on each biographical data sheet, and this number was repeated on the material contained within each of the sealed envelopes. (A copy of the biographical data sheet is included in Appendix A.)

The packets were arranged in a box according to the identification number on the data sheet. As a student

entered the classroom, he selected a packet and separated the biographical data sheet from the packet. After completing the information on the biographical data sheet, the student wrote his name and phone number on each of the sealed envelopes. On his way out of the room, the data sheet was placed in one box and the envelopes in another. When a student appeared later to complete part of the study, the sealed envelopes containing the task forms with his identification number were returned to him by noting his name and task form number on the outside of the envelope. This procedure was followed throughout the data collection process to help protect the students' anonymity, to prevent contamination by the investigators' knowledge of the students' performances from one task to another, and to permit the scheduling of appointments for the various tasks.

Ninety college students, 45 males and 45 females, were randomly selected from the population of 300 students in the following manner. First, all students took the Defining Issues Test (DIT) and the Inventory of Personality Development (IPD). Biographical data sheets were checked for age, and any student not within the age range 18 to 23 years was

XUM

dropped from the study. Approximately 16 students were over age. Second, a random sample of 90 students who took both the DIT and IPD was taken with the restriction that males equal females. Each student's DIT protocol was then given Rest's (Note 6) Consistency Check. Students whose protocol did not meet this validity check were also dropped from the sample, and additional students were randomly selected to replace them. Approximately 13 students were eliminated from the sample due to the DIT Consistency Check.

The mean age of the entire sample was 20.18 years with a standard deviation of 1.27. The mean age of the 45 females was 19.5 with a standard deviation of .96. The mean age of the 45 males was 20.78 with a standard deviation of 1.33. Comparison of the age means of the two sexes indicated males were significantly older than females, t (89) = 5.15, $p < .01$. Distributions of age, year in college, and social class levels by sex are presented in Table 1. Hollingshead's (Note 2) Two Factor Index of Social Position was used to assign the students to 1 of 5 levels (5 being lowest and 1 highest). The mean social class level for the entire sample was 2.83 with a standard deviation of 1.15, indicating an

Table 1

Distributions of Chronological Age, Social Class Level, and College Year in the Sample by Sex

Variable Level		Males	Females
Age in Years	18	0	5
	19	8	21
	20	11	11
	21	13	7
	22	9	1
	23	4	0
Social Class Level[1]	I	9	6
	II	6	12
	III	15	14
	IV	11	12
	V	4	1
College Year	Freshman	2	2
	Sophomore	12	38
	Junior	17	13
	Senior	14	2

[1]Calculated by Hollingshead's (Note 2) Two Factor Index of Social Position.

approximately middle-class sample. A chi square test of Independence performed on social class by sex indicated only chance differences in the two social class distributions. Distribution of college major for the sample is varied and is presented in Table 2.

Instruments

The Defining Issues Test was administered first and the Inventory of Personality Development about one week later to groups of 10 to 120 students at a time.

Defining Issues Test. Rest's (Note 1) Defining Issues Test (DIT) includes six of Kohlberg's standard dilemmas. A subject reads a moral dilemma and then is presented with 12 issues or considerations bearing upon that dilemma. Each issue is designed to exemplify some distinctive characteristic of Kohlberg's Stages 2, 3, 4, 5A, 5B, or 6. For each dilemma, the subject rates each of the 12 issues on a Likert scale of importance ("most," "much," "some," "little," "no") in deciding the appropriate course of action. At the bottom of the page, the subject then ranks his choice of the four most important issues presented in the set of 12 issues. Two issues per story do not represent a Kohlberg stage. One

Table 2

College Majors of Sample by Sex

Major	Male	Female
Sociology	5	3
Business	10	1
Speech Pathology	0	2
Education	11	10
Occupational Therapy	0	2
Fine Arts	1	2
Physical Education	1	1
Preveterinary Science	1	0
Biology	1	0
Medical Technology	0	2
Mathematics	1	1
Nursing	2	8
Home Economics	0	7
Mass Communications	3	0
English	2	1
Psychology	6	2
Undecided	1	3

issue is indicated as "A" and features items intended to typify an "antiestablishment" orientation or a Stage 4½. The other issue is termed "M," and represents lofty sounding but meaningless items that reflect a tendency to endorse pretentious but meaningless statements.

In scoring the DIT, weights of 4, 3, 2, and 1 are assigned to the issues ranked first, second, third, and fourth, respectively. The weights attributed to the principled issues (items keyed as 5A, 5B, and 6) are summed over all six stories. Then this result is expressed in terms of the percentage of weights attributed to the principled stages and designated P. The P score can range from 0 to 95 and is interpreted as the relative importance a subject gives to principled considerations in making moral judgments. A test-retest reliability of .81 was obtained on the DIT for a 12-week interval with ninth graders (Rest, Note 6). Interrater scoring reliability was calculated on 30 randomly selected DIT protocols in the present study, and a Pearson *r* of .99 was obtained.

Rest (Note 6) recommended a Consistency Check of the DIT protocols. If a student ranks an item first, then his

ratings for any other item should not exceed the rating of the item ranked first although other items may tie this item in rating. The student's first and second ranks are checked and if there are inconsistencies on more than two stories, or if the number of inconsistencies on any story exceeds eight instances, the protocol is discarded.

Inventory of Personality Development. This instrument (IPD) was developed and validated in both cross-sectional and longitudinal studies by Constantinople (1969) as a measure of characteristics indicating successful and unsuccessful resolutions of Erikson's first six stages of psychosocial development. A 7-point self-rating scale is used wherein the student is asked to circle the number from 1 to 7 indicating the extent to which a given phrase or statement is very characteristic or very uncharacteristic of him. Sixty statements are included, 10 for each stage. Five statements at each stage represent negative resolutions and five positive. For the present study, the 30 unsuccessful resolution items were transformed by reversing their scales so that complete disagreement with a negative statement was treated as a complete agreement with a positive statement as

recommended by Nunnally (1969). All scale responses were summed to obtain an overall score for psychosocial development. Scores could range from a score of 420 indicating generally successful resolution of all crises to a minimum score of 60 indicating generally unsuccessful resolution.

Constantinople reported test-retest reliability estimates for the subscales of industry versus inferiority, identity versus identity diffusion, and intimacy versus isolation ranging from .45 to .81 with a median *r* of .70 (*N* = 150). Coefficient alpha was calculated in the present study as a measure of reliability based on internal consistency of the measure and was .90 for the total score. Reliabilities for the subscales were: .73 for basic trust, .45 for autonomy, .67 for initiative, .77 for industry, .72 for identity, and .69 for intimacy.

Piagetian tasks. All students were individually presented with the pendulum, rods, and balance tasks in counterbalanced order by the same experimenter. (A technical description of each task apparatus is included in Appendix B.) When each student appeared at the experimental room, he selected his envelope from an alphabetical file and

removed the task form. He was then introduced to the Piagetian tasks (PT) as follows:

> This is a balance made of aluminum. The holes are numbered from the center so that you can tell how far out any hole is. You see there are 29 holes on each side of the center or fulcrum. Every other hole is numbered. Here are some weights. Feel them. They weigh 20, 15, 10, 5, 2, and 1 gram, and the weight is engraved on the bottom of each. You can see that they all have hooks so that you can attach them to the balance arm. Try it with the 20-gram weight in hole 20 on your left. Note that the arm is no longer in balance and cannot move any farther as it has met the stop of the vertical post. Now take the weight off the balance arm. Note that the balance arm is again level and in equilibrium. Your task is to explain what factor or factors contribute to producing equilibrium in the balance.
>
> This is a pendulum. As you can see, it is made up of a mounted vertical post to which is attached this horizontal bar. Observe that there are four strings attached to the horizontal bar: one long, one short, and two medium in length. Here also are different size weights: 500, 100, 50, and 200 grams. See the numbers engraved on them. Feel them. Now take up that 50-gram weight and place it on the long string and let it swing. You see a pendulum in action. Notice that the pendulum or weighted bob is swinging back and forth past the vertical post at a characteristic speed, rate, or frequency--maybe about once per second. Your task is to find out and tell me what factor or factors affect the speed, rate, or frequency of the pendulum's swing past the vertical post.

> This apparatus consists of steel and brass rods. They are clamped at this end and suspended at this other end over a metal strip. These are 300, 200, 100, and 40 gram weights. Feel them. They have center holes so they can be placed on the pins at the suspended ends of the rods. Now place the 200-gram weight on rod 12 (long, brass, thin, square). Watch the rod bend as you place the weight on it. Notice that it was flexible enough to touch the metal strip. Observing this bending or flexibility is important. Incidently, notice that the indicator light flashes on when the metal strip is touched. Now place the same 200-gram weight on rod 3 (short, steel, thin, round). Watch the rod bend as you place the weight on it. Notice that it wasn't flexible enough to touch the metal strip. Your task is to tell me what factor or factors are important influences in the bending or flexibility of these rods.

Each introduction to the tasks was followed by the structured sequence of questions for that task before the explanation of the succeeding task was given. The 90 interviews were completed within three-and-one-half weeks and required approximately 40 minutes per student.

The formal operations tasks were developed and scored according to the theoretical criteria established by Inhelder and Piaget (1958). Lovell's (Note 7) specific sequence of questions, including the work relationship questions, was used for the balance task interview. Lovell's questioning procedure was applied to the other two tasks. (The questions

for each task used in the present study are presented in Appendix C.) However, the scoring method was pass-fail with a formal operations level response required for passing. A weight of 1 was assigned to a dichotomous-response question (yes or no), a weight of 3 to a question requiring a verbal explanation, and a weight of 5 to a question requiring a demonstration plus a verbal explanation. The same weighting was applied to comparable questions across tasks. The number of questions and total possible points, respectively, for each task were: rods, 18 and 54; pendulum, 11 and 33; and balance, 19 and 57. Maximum total score for the three tasks was 144.

Interscorer reliability calculated on 30 randomly selected protocols was perfect. Coefficient alpha was calculated in the present study as a measure of reliability based on internal consistency of the PT measure and was .82 for the PT total score. Reliabilities for the three subscales were: .86 for rods, .88 for pendulum, and .84 for balance.

Marcia identity status interview. This semistructured interview (MSI) was developed by Marcia (1964). Questions are asked about occupational goals, religious, and political

beliefs. Criteria of crisis and commitment set forth by Marcia are used to classify the student in terms of one of four identity crisis resolutions. The criteria for identity achievement status are passage through a crisis or decision period and commitment to occupation and/or ideology. For foreclosure, the criteria are no apparent passage through any real decision period, but commitment to occupation and/or ideology. In this case, choices coincide with those of parents or parent surrogates whom the subject does not seriously question. For moratorium status, the criteria are presently in a crisis period of trying to make up one's mind, and commitments are vague and general. For identity diffusion status, the criteria are either passage through a crisis or experiencing no crisis and little, if any, commitment in either case.

For one-half of the sample, the PT were administered first with the MSI following a week or two later. The procedure was reversed for the remaining one-half of the sample. The MSI was also given by another investigator* on an

---

*J. M. Creighton, Assistant Professor of Home Economics and Professional Counselor.

individual basis to prevent possible contamination through knowledge of subjects' cognitive performances. Each interview required approximately 10 to 15 minutes. All interviews were taped as well as recorded in written form by the interviewer for rating by the judges.

Previous interrater reliabilities have ranged from 73 to 87% (Podd, Marcia, & Rubin, 1968; Toder & Marcia, 1973). Interrater reliability was calculated in the present study in two ways: intraclass correlation analysis and percentage of agreement between judges. The degree of agreement among three judges' ratings of interviews as represented by the intraclass correlation was .61. Percentage of agreement between judges was also calculated: between judges A and B, 48%; between judges A and C, 71%; and between judges B and C, 69%. Judges A and C rated all protocols while judge B rated 53. Subjects were assigned to a status by the modal score received from the three judges.

XUM

CHAPTER IV

Results

Since the major thrust of the study was concerned with the interrelation among three individual difference variables, the first three hypotheses were tested by multiple regression analyses.[1] Means, standard deviations, and ranges of all variables involved in the multiple regression analyses are included in Table 3.

The first hypothesis of the study was not supported. As can be seen in Table 4, scores obtained on measures of formal operations and principled morality are positively correlated, but the IPD measure of ego development was not related to Piagetian task performance or performance on the DIT.

---

[1] Scatter diagrams were constructed using pairs of variables: Piagetian tasks and DIT, Piagetian tasks and IPD, and DIT and IPD. There was no indication in any diagram of a curvilinear relationship between the variables.

XUM

Table 3

Means, Standard Deviations, and Ranges of Five Variables Used in the Multiple Regression Analyses

Variables	Subjects								
	Males (N = 45)			Females (N = 45)			Total (N = 90)		
	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range	$\bar{X}$	SD	Range
Age	20.78	1.33	19- 23	19.51	.96	18- 22	20.18	1.27	18- 23
Social Class	2.91	1.74	1- 5	2.78	1.05	1- 5	2.83	1.15	1- 5
Piagetian Tasks	66.53	26.49	17-128	64.80	16.19	34-102	65.67	21.85	17-128
IPD	303.64	33.50	223-377	302.71	28.10	228-360	303.18	30.75	223-377
DIT	23.53	7.94	7- 41	25.69	7.32	14- 43	24.61	7.67	7- 43

Table 4

Intercorrelations Among Four Variables in the First Multiple Regression Analysis

Variables	Sex	Piagetian Tasks	IPD	DIT
Sex	1.00			
Total Piagetian tasks scores	- .04	1.00		
Total Constantinople IPD scores	- .02	- .07	1.00	
DIT	.14	.39	.00	1.00

The first multiple regression analysis involved sex, total Piagetian task score and total IPD score as independent variables and the absolute number of principled morality responses on the DIT as the criterion variable. As indicated in Table 5, the multiple R obtained was .42. The test of significance indicated that this value was significantly greater than zero, F (3, 86) = 6.18, $p < .01$. The F test for the .16 beta weight for sex was not significant, indicating sex differences explained little of the variance in the DIT distribution. Therefore, the second hypothesis was also not supported. The relation between the triad of constructs is no greater for males than females. The third hypothesis was also not supported in that ego development did not make a contribution to explaining variance in the DIT score distribution not accounted for by performance on the Piagetian tasks.[2]

Since performance on the Piagetian tasks accounted for only 18% of the variance in the use of principled morality,

---

[2] A similar regression analysis using the P score of the DIT as the dependent variable and omitting the sex factor as an independent variable was run and produced comparable results.

Table 5

Multiple Regression Analysis for Piagetian Tasks, Constantinople IPD Measure, and DIT Principled Morality Responses

Independent Variables	Multiple Correlation	Multiple R Squared	Beta	F*
Sex	.14	.02	.16	2.59
Piagetian tasks	.42	.18	.40	16.45
Constantinople IPD	.42	.18	.03	.12

*df = 3, 86
Multiple R = .42

a considerable portion of the variance was still unexplained. Therefore, another multiple regression analysis was run with social class, age, Piagetian task score, and the IPD total score as independent variables and the DIT P score as the dependent variable. Intercorrelations among these five variables are shown in Table 6. The multiple R obtained was .52. The test of significance yielded an F (4, 85) = 8.07, $p < .01$, indicating 27% of the variance in the DIT P scores can be attributed to variation in the four independent variables. The beta weights for age and the IPD were not significant. The -.35 beta weight for social class was significant, F (4, 85) = 14.14, $p < .01$, and therefore social class assignment explained an additional 12% of the variance in DIT scores not accounted for by Piagetian task performance. The negative correlation for the social class beta weight is a reflection of the scale's assignment of 1 to the highest social class and 5 to the lowest.

The fourth hypothesis of the study was that individuals above the median on the Piagetian formal operations measure also obtain higher scores on the IPD than those individuals below the median. IPD total scores were classified by the

Table 6

Intercorrelations Among Five Variables Included in the Second Multiple Regression Analysis

Variables	Age	Social Class	Piagetian Tasks	IPD	DIT
Age	1.00				
Social Class	.01	1.00			
Piagetian Tasks	- .06	- .04	1.00		
IPD	.11	.14	- .07	1.00	
DIT	- .08	- .35	.39	.00	1.00

student's performance on the Piagetian tasks and analyzed by a one-way analysis of variance. There was no significant difference in the IPD total score as a function of being above or below the median on the Piagetian tasks (see Table 7).

The fifth hypothesis involved blocking on the Marcia identity status interview. It was hypothesized that blocking on Marcia's identity status measure reveals a significantly higher level of cognitive functioning on the Piagetian tasks among those who have questioned their identity than among those who have not. Therefore, Piagetian task total scores were classified as to whether the student was in the identity achievement or moratorium status versus foreclosure or diffusion. The one-way analysis of variance produced a significant F (1, 87) = 3.96, $p < .05$. The Identity achievement and moratorium groups had a mean of 71.11 (SD = 23.38), significantly higher than that of the foreclosure and identity diffusion group mean of 61.90 (SD = 19.66) (see Table 8).

The sixth hypothesis of the study was that blocking on the Marcia identity status measure reveals a significantly

Table 7

Summary of Analysis of Variance of Constantinople IPD as a Function of Dichotomized Piagetian Task Total Scores

Source	SS	df	MS	F
Between Groups				
Above Median vs. Below Median on Piagetian Tasks	24.40	1	24.40	.01
Within Groups	194244.30	88	2207.32	
Total	194268.70	89		

Table 8

Summary of Analysis of Variance of Piagetian Task Total Scores as a Function of MSI Identity Categories

Source	SS	df	MS	F
Between Groups				
Identity Achievers and Moratorium vs. Foreclosure and Identity Diffusion	1844.38	1	1844.38	3.96*
Within Groups	40537.09	87	465.38	
Total	42381.47	88**		

*$p < .05$

**One member of the total sample did not complete the Marcia Interview.

higher level of principled morality among those who have questioned their identity than among those who have not. The results of this analysis were not significant (see Table 9).

A subsequent one-way analysis of variance of IPD scores using the four Marcia identity classifications was also not significant. In other words, there was no relation between resolution of Erikson's psychosocial crises as measured by the IPD and the judges' ratings of the resolution of identity crises (see Table 10).

To provide additional information regarding the variation in the DIT principled morality scores as a function of Piagetian task total scores, the latter scores were quartiled and used as a classification variable with the DIT sum of principled morality scores as the dependent variable. The one-way analysis of variance produced a significant F (3, 86) = 6.00, $p < .01$. The means and standard deviations are listed in Table 11. The Q_3 DIT mean was significantly higher than the Q_2 DIT mean, S (3, 86) = 6.44, $p < .01$. The Q_2 DIT mean was significantly higher than the Q_1 DIT mean, S (3, 86) = 5.83, $p < .01$. Thus, there were

Table 9

Summary of Analysis of Variance of DIT Total Scores as a Function of MSI Identity Categories

Source	SS	df	MS	F
Between Groups				
Identity Achievers and Moratorium vs. Foreclosures and Diffusion	19.82	1	19.82	.30
Within Groups	5665.95	87	65.13	
Total	5685.77	88		

Table 10

Summary of Analysis of Variance of

IPD Total Score as a Function

of MSI Identity Categories

Source	SS	df	MS	F
Between Groups				
Identity Achievers and Moratorium vs. Foreclosure and Diffusion	221.40	1	221.40	.23
Within Groups	83939.60	87	964.82	
Total	84161.00	88		

Table 11

DIT Means and Standard Deviations as a Function of Quartiled Piagetian Task Scores

Variable		Piagetian Task Scores			
		Q_1	Q_2	Q_3	Q_4
	Range	17-51	52-63	64-78	79-128
	$\bar{X}$	41.30	56.26	71.50	95.14
	SD	8.43	3.46	4.23	14.48
	N	22	22	23	23
DIT	$\bar{X}$	19.91	23.52	27.64	27.64
	SD	7.28	4.47	4.47	6.93

significant increases in DIT means as the Piagetian task total scores increased from Q_1 to Q_2, Q_2 to Q_3, but not from Q_3 to Q_4.

Recently Rest (Note 8) has suggested that comparative research might profitably use the ascending slope of growth curves as a developmental marker. In addition to noting the stage of predominant use, Rest (1969) also looked at the most advanced stage at which a subject produced at least 20% of his responses. Rest found greater morality score relations with comprehension and intelligence measures using this advanced or highest stage of substantial usage (HSU).

Since Rest's (1969) findings were provocative, the HSU Index was calculated for each protocol in the present study. All but one student in the sample met the 20% response within an advanced stage criteria, leaving 89 that could be studied using the HSU Index. The sample was distributed across the Stages 4, 5A, and 5B of the DIT morality scores with N's of 22, 65, and 2, respectively. The means, standard deviations, and cell memberships of each of the three stages are listed in Table 12. Therefore, despite the unequal

XUM

Table 12

Piagetian Task and IPD Means and Standard Deviations as a Function of Highest Substantial Usage Stage of the DIT

		Stage 4	Stage 5A	Stage 5B
	$\bar{X}$	17.22	26.60	39.50
	N	22	65	2
Piagetian Task Score	$\bar{X}$	53.23	67.61	89.50
	SD	21.79	18.81	17.00
IPD Scores	$\bar{X}$	299.32	302.45	355.00
	SD	35.97	32.66	22.00

cells, a one-way analysis of variance was run on Piagetian task total score using the HSU morality Stages of 4, 5A, and 5B as the classification variable. The result was significant, F (2, 86) = 5.57, $p < .01$. Scheffé mean comparisons revealed that the Stage 5A Piagetian task mean was significantly higher than the Stage 4 mean, S (2, 86) = 11.50, $p < .01$, and the Stage 5B Piagetian task mean was significantly higher than the Stage 4 mean, S (2, 86) = 3.24, $p < .01$. The difference between Stage 5B and Stage 5A Piagetian task means was not significant.

One-way analysis of variance was then run on the IPD total score using the HSU DIT Stages of 4, 5A, and 5B as the classification variable. The result was again significant, F (2, 86) = 3.23, $p < .05$. Scheffé comparisons of the means indicated Stage 5B IPD mean was significantly higher than Stage 5A mean, S (2, 86) = 3.43, $p < .01$, and Stage 5B IPD mean was significantly higher than Stage 4 mean, S (2, 86) = 3.40, $p < .01$. The Stage 5A IPD mean was not significantly higher than the Stage 4 IPD mean.

CHAPTER V

Discussion

The present study represents an initial step in the investigation of how formal operations, ego development, and principled morality relate and sequence. Assessment was made of the relative contribution of Piagetian formal operations and Eriksonian ego development to Rest's adaptation of Kohlberg's principled morality. Sex, age, and social class relations to principled morality were also investigated.

When the Constantinople Inventory of Personality Development and the Piagetian tasks were used as independent variables in the regression analyses, only the formal operations measure made a significant and unique contribution to the variance in Rest's P scores. The correlation of .39 is comparable to the product-moment correlation of .58 between formal operations and principled morality reported for college women by Tomlinson-Keasey and Keasey (1974). The similar relations were obtained even though the two

XUM

studies differed in the following ways: First, the present study included a more highly structured questioning procedure for the formal operations tasks and adhered more strictly to Piaget's highest level responses as criteria for passing or failing. Second, the Rest paper-pencil instrument of the present study measures comprehension of morality statements while Tomlinson-Keasey and Keasey used both a questionnaire form and the standard Kohlberg interview that measure spontaneous usage. Third, the objective scoring of the Rest measure is not subject to the scorer bias for which Kohlberg's measure has been criticized (Kurtines & Grief, 1974). Criticism has also been made of the Piagetian assumption that the different formal operations tasks measure a singular cognitive structure (Ross, 1974). The overall coefficient alpha of .82 obtained for Piaget's rods, pendulum, and balance tasks indicates considerable consistency.

Additional analyses were made using the highest stage of substantial usage of moral reasoning of the Defining Issues Test. This developmental marker that represents the ascending slope of the growth curve, was suggested by Rest

(Note 8) for comparative developmental research. Using this index facilitated relating findings to past research because Rest's P score prevents observing transition from conventional to principled morality or transition within specific principled morality levels. The students of the present study were in Stages 4, 5A, and 5B indicating that they were possibly moving toward applying rationales for selecting among social relationships of "law and order," "social contract," or "intuitive humanism," respectively.

Significant Inventory of Personality Development and formal operations mean differences were obtained when the students were classified by their highest stage of substantial usage, i.e., the last stage that included at least 20% of their responses. Mean differences suggested a higher level of formal operations accompanies a "social contract" (5A) orientation as compared to a "law and order" (4) orientation, while the higher moral level of "intuitive humanism" (5B) is accompanied by a more positive self-concept. The latter conclusion is offered because the Inventory of Personality Development requires self-evaluation for responding to the test items and so fulfills a function

comparable to various self-concept measures. The majority of the students were in Stages 5A, a lesser number in Stage 4, and only two in Stage 5B within which the significant self-concept relation was obtained. Therefore, too few students had attained a sufficient level of principled morality and positive self-concept to adequately test the predicted relation of principled morality and ego development within the regression analyses.

The concomitant appearance of Stage 5B principled morality and significantly higher self-concept leaves unanswered the question of whether focus upon moral values, the self, or something else precipitates movement to Stage 5B. The fact that the Piagetian task mean for Stage 5B was not significantly higher than the mean for Stage 5A suggests Stage 5B morality does not reflect more complex logical reasoning as Kohlberg and Gilligan (1971) have maintained. Additional support for this suggestion is derived from the quartiled Piagetian tasks analysis that showed significant increase in formal operations in the fourth quartile was not accompanied by any increase in principled morality. Formal operations appear to be necessary for the development of

principled morality but only to a certain point, and then something more is needed to attain the higher principled morality levels. That something more may be ego development as evidenced by the significantly higher self-concepts of the two Stage 5B morality students. However, conclusions derived from a cell membership of two are admittedly very tenuous. Nonetheless, they extend the hint that perhaps ego development is not necessary for initial comprehension of principled morality, but it may be necessary for progress in comprehending higher levels of principled morality that precede its spontaneous use. The results of this initial exploration are sufficiently intriguing to warrant replication of this study including students of lower as well as more advanced morality levels. Longitudinal study is needed to adequately determine the role of Eriksonian ego development in the formal operations, ego development, and principled morality interrelation.

Absence of a significant sex relation agrees with the findings of Rest et al. (1974), and is contrary to the typical result of using Kohlberg's interview approach. Kohlberg and Kramer (1969) and Holstein (1969) obtained

higher morality scores for males than females using Kohlberg's morality interview. Constantinople (1969) has suggested her Inventory of Personality Development items also have a male bias, but no sex differences were obtained in the present study despite this bias. Neither were sex differences found for the Piagetian tasks. The absence of a significant age relation indicates neither principled morality, formal operations, nor ego development are a function of age within the age range 18 to 23.

Using the second ego measure of the study, Marcia's identity status interview, identity questioners scored higher than non-questioners on the Piagetian tasks. The significant relation indicates formal operations may be required for identity questioning as hypothesized by Erikson and Piaget. This finding provides some additional construct validity for the Marcia identity status interview. Since the Marcia measure assesses handling of identity crises and Constantinople's Inventory measures self-evaluation of successful resolution of prior as well as current crises, the two ego measures should have related but they did not do so. Considering the viability of Erikson's theory, there

is need for continued study, particularly discriminant and convergent validity studies of measures of his constructs, e.g., ego development, identity resolution, etc.

Assigned status from the Marcia interview did not relate to principled morality. This result is contrary to the Kohlberg and Gilligan (1971) hypothesis and Podd's (1970) finding with Kohlberg's interview that more identity achievers had postconventional moral reasoning than would be expected by chance. Comparison of Podd's result with that of the present study is difficult due to (a) the variability in scoring procedures of Rest's and Kohlberg's measures, (b) the Defining Issues Test incorporates six of the nine dilemmas of Kohlberg's standard interview whereas Podd used only four dilemmas and hence, Podd's measure was probably less reliable, (c) Rest's instrument measures comprehension of moral issues while Kohlberg's interview measures spontaneous use. However, for the present study no relation was found between identity questioning with the Marcia ego measure and Rest's P score or his highest stage of substantial usage.

The -.35 beta weight for social class, as measured by Hollingshead's Index of Social Position (Note 2), indicates

that principled morality has a socio-economic component in addition to the cognitive component. Kohlberg (1969) explained the socio-economic component in moral development as reflecting lower-class feelings of lack of control over outcome and lack of participation in the social order. On the other hand, the middle and upper classes feel a sense of power in, and responsibility for, the institutions of government and economy. However, the strength of this argument may be questioned for college students living in an urban area in an era of widespread enforcement of the Equal Opportunity Act. The social class component in principled morality is difficult to explain without invoking reasons that should have affected the cognitive tasks as well.

The fact that morality orientations differed by social class status while formal thought, ego development and identity crisis measures did not should be noted. The lack of social class differences in self-concept among the students in the present study has been suggested by several recent studies using other self-concept measures (Carlson, 1965; Trowbridge, 1970; Wegner, 1973). From the perspective of Kohlberg's

explanation for social class differences in morality, the students in this sample did not extend the feeling of lack of control over outcomes to personal perspectives. In fact, inspection of cell means indicated the lowest social class self-concepts were the most positive in the sample while the self-concepts of the highest social class were the least positive. This result could be explained by Carlson's (1965) finding that lower-class students, reflecting societal change, scored higher on a self-concept measure, and Rosenberg's (1965) finding that upper-class students react to parental demands for achievement by scoring lower on self-concept measures.

Society today is characterized by mobility, flexibility, lack of continuity, temporary relationships, and in the aftermath of Watergate during which this data was collected, lack of fidelity. Erikson's theory emphasizes stability, continuity and fidelity. Adolescents are highly vulnerable to societal pressures (Nesselroade & Baltes, 1974) that encourage development of serial identities to contend with the rapid social and technological change. Is it possible that different criteria for comparing personalities or

self-concepts with other developmental markers are needed than those delineated by Erikson? Erikson's theory historically has not been empirically heuristic nor have attempts at operationalizing his constructs been particularly successful. Perhaps the additional studies suggested will provide further insight into this issue.

These suggestions and questions are extended with awareness that the sample of the present study represents a limited population of college students. They are undergraduates of Arizona State University that had, as of 1973, a total enrollment of approximately 30,000 students. Over 80% of the students are Arizona residents. The largest enrollment is in the College of Liberal Arts, followed by the College of Education and then the College of Business. The sex ratio is 57% male and 43% female. The median age is 22 years, and 63% of the students are single. The rate of student employment is 61%. Approximately one-half of the students list their religious preference as Protestant, one-fourth as Catholic, 3% each as Jewish or Mormon, and the remainder as agnostic, atheist, or no preference. A majority of the students consider themselves politically

XUM

liberal, 40% conservative, and 5% radical (Note 9). The university could be categorized generally as an urban, commuter-oriented university.

In summary, the present study found that among college undergraduates a significant contribution to the comprehension of principled morality was made by formal operations and socio-economic class. No concomitant contribution was made by the ego or self-concept measure in the regression analyses. When developing morality stages were analyzed, comparison of findings with past morality research and inspection of score changes within principled morality levels was facilitated. Using this developmental marker, the results suggested that beyond a certain level of formal operations, principled morality and self-concept continue to develop without concomitant increases in formal operations. Due to the limited cell membership at the 5B level, additional cross-sectional and longitudinal studies incorporating the Piagetian, Eriksonian, and Kohlbergian constructs were suggested.

REFERENCE NOTES

XUM

Reference Notes

1. Rest, J. R. Opinions and social problems. Unpublished test, 1972. (Available from James Rest, Department of Psychological Foundations, University of Minnesota, Minneapolis, Minnesota 55454).

2. Hollingshead, A. B. Two-factor index of social position. Unpublished manuscript, 1957. (Available from A. B. Hollingshead, Department of Sociology, Yale University, New Haven, Connecticut 06510).

3. Constantinople, A. Inventory of personality development. Unpublished test, 1966. (Available from Ann Constantinople, Department of Psychology, Vassar College, Poughkeepsie, New York 12601).

4. Meyer, A. J. A developmental study of three manifestations of consciousness. Paper presented at the meeting of the Western Psychological Association, San Francisco, April 1974.

5. Lovell, K. Piaget in perspective: The experimental foundations. In K. Lovell (Chair), Piaget in perspective. Conference at the University of Sussex, Sussex, 1968.

6. Rest, J. Manual for the Defining Issues Test. Unpublished manuscript, 1974. (Available from James Rest, Department of Psychological Foundations, University of Minnesota, Minneapolis, Minnesota 55454).

7. Lovell, K. Equilibrium in the balance. Unpublished experiment, 1959. (Available from K. Lovell, The University of Leeds, Leeds, LS2-9Jt, G.B.).

8. Rest. J. New approaches in the assessment of moral judgment. Unpublished manuscript, University of Minnesota, 1974. (Available from James Rest, Department of Psychological Foundations, University of Minnesota, Minneapolis, Minnesota 55454).

9. Axelrod, M. Personal communication, December 18, 1974.

REFERENCES

References

Bruner, J. S., Goodnow, I. J., & Austin, G. A. A study of thinking. New York: Wiley, 1956.

Carlson, R. Stability and change in the adolescent's self-image. Child Development, 1965, 36, 659-666.

Constantinople, A. An Eriksonian measure of personality development in college students. Developmental Psychology, 1969, 1, 357-372.

Cooper, D. The analysis of an objective measure of moral development. (Doctoral dissertation, University of Minnesota, 1972). Dissertation Abstracts International, 1973, 33(10), 5545A. (University Microfilms No. 73-10, 536)

Cowan, P. A., Langer, J., Mavenrich, J., & Nathanson, M. Social learning and Piaget's cognitive theory of moral development. Journal of Personality and Social Psychology, 1969, 11(3), 261-274.

Erikson, E. H. Childhood and society (2nd ed.). New York: Norton, 1963. (Originally published, 1950.)

Erikson, E. H. Identity youth and crisis. New York: Norton, 1968.

Flavell, J. H. The developmental psychology of Jean Piaget. Princeton, N.J.: Van Nostrand, 1963.

Flavell, J. H., Botkin, P. T., Fry, C. L., Wright, J. W., & Jarvis, P. E. The development of role-taking and communication skills in children. New York: Wiley, 1968.

Flavell, J. H., & Wohlwill, J. F. Formal and functional aspects of cognitive development. In D. Elkind & J. H. Flavell (Eds.), Studies in cognitive development. New York: Oxford University Press, 1969.

Goodnow, J. J. A test of milieu effects with some of Piaget's tasks. Genetic Psychological Monographs, 1962 (Whole No. 555).

Harvey, O. J., Hunt, D. E., & Schroder, H. M. Conceptual systems and personality development. New York: Wiley, 1961.

Holstein, C. B. Parental consensus and interaction in relation to the child's moral judgment. (Doctoral dissertation, University of California, Berkeley, 1969). Dissertation Abstracts International, 1970, 31(4), 1888A. (University Microfilms No. 70-17, 579)

Hunt, D. E. A conceptual systems change model and its application to education. In O. K. Harvey (Ed.), Experience, structure, adaptability. New York: Springer-Verlag, 1966.

Inhelder, B., & Piaget, J. [The growth of logical thinking from childhood to adolescence] (A. Parsons & S. Milgram, trans.). New York: Basic Books, 1958.

Kohlberg, L. The development of modes of moral thinking in the years ten to sixteen. Unpublished doctoral dissertation, University of Chicago, 1958.

Kohlberg, L. The development of children's orientations toward a moral order: I. Sequence in the development of moral thought. Vita Humana, 1963, 6, 11-33.

Kohlberg, L. From is to ought: How to commit the naturalistic fallacy and get away with it in the study of moral development. In T. Mischel (Ed.), Cognitive Development and Epistemology. New York: Academic Press, 1971.

XUM

Kohlberg, L., & Gilligan, G. The adolescent as a philosopher: The discovery of the self in a postconventional world. Daedalus, 1971, Fall, 1051-1086.

Kohlberg, L., & Kramer, R. Continuities and discontinuities in childhood and adult moral development. Human Development, 1969, 12, 93-120.

Kurtines, W., & Greif, E. B. The development of moral thought: Review and evaluation of Kohlberg's approach. Psychological Bulletin, 1974, 81(8), 453-470.

Lambert, H. V. A comparison of Jane Loevinger's theory of ego development and Lawrence Kohlberg's theory of moral development. Unpublished doctoral dissertation, University of Chicago, 1972.

Lee, L. L. The concomitant development of cognitive and moral modes of thought: A test of selected deductions from Piaget's theory. Genetic Psychology Monographs, 1971, 83, 93-146.

Loevinger, J. The meaning and measurement of ego development. American Psychologist, 1966, 21, 192-206.

Lovell, K. A follow-up study of Inhelder and Piaget's the growth of logical thinking. British Journal of Psychology, 1961, 52, 143-153.

Marcia, J. E. Determination and construct validity of ego identity status. (Doctoral dissertation, The Ohio State University, 1964). Dissertation Abstracts, 1965, 25(11), 6763. (University Microfilms No. 65-5606)

Marcia, J. E., & Friedman, M. I. Ego identity status in college women. Journal of Personality, 1970, 2, 249-263.

McCandless, B. R. Adolescents behavior and development. Hinsdale, Ill.: Dryden Press, 1970.

XUM

Miller, P. H., Kessel, F. S., & Flavell, J. H. Thinking about people thinking about people thinking about . . .: A study of social cognitive development. Child Development, 1970, 41, 613-623.

Nesselroade, J. R., & Baltes, P. B. Adolescent personality development and historical change: 1970-1972. Monographs of the Society for Research in Child Development, 1974, 39(1), 1-80.

Nunnally, J. C. Psychometric theory. New York: McGraw-Hill, 1967.

Piaget, J. [The moral judgment of the child] (M. Gabainn, trans.). New York: Free Press, 1965. (Originally published, 1932.)

Piaget, J. [The psychology of intelligence] (M. Piercy & D. E. Berlyne, trans.). Totowa, N.J.: Littlefield, Adams, 1968. (Originally published, 1950.)

Piaget, J., & Inhelder, B. [The psychology of the child] (H. Weaver, trans.). New York: Basic Books, 1969. (Originally published, 1966.)

Podd, M. The relationship between ego identity status and two measures of morality. (Doctoral dissertation, State University of New York at Buffalo, 1970). Dissertation Abstracts International, 1971, 31(9), 5634B. (University Microfilms No. 71-6107)

Podd, N., Marcia, J. E., & Rubin, B. The effects of ego identity status and partner perception on a prisoner's dilemma game. Journal of Social Psychology, 1968, 82, 117-126.

Rest, J. The hierarchical nature of moral judgment: A study of patterns of comprehension and preference of moral stages. Journal of Personality, 1973, 41, 86-109.

XUM

Rest, J. R. The cognitive developmental approach to morality: The stage of the art. Counseling and Values, 1974, 18(2), 64-78.

Rest, J., Cooper, D., Coder, R., Masanz, J., & Anderson, D. Judging the important issues in moral dilemmas: An objective measure of development. Developmental Psychology, 1974, 10(4), 491-501.

Rest, J., Turiel, E., & Kohlberg, L. Level of moral development as a determinant of preference and comprehension of moral judgment made by others. Journal of Personality, 1969, 37, 225-252.

Rosenberg, M. Society and the adolescent self-image. Princeton, N.J.: Princeton University Press, 1965.

Ross, R. J. The empirical status of the formal operations. Adolescence, 1974, 9(35), 413-420.

Sullivan, E. V., McCullough, E., & Stager, M. A developmental study of the relationship between conceptual, ego, and moral development. Child Development, 1970, 41, 399-411.

Toder, N. L., & Marcia, J. E. Ego identity status and response to conformity pressure in college women. Journal of Personality and Social Psychology, 1973, 26, 287-296.

Tomlinson-Keasey, C. Formal operations in females from eleven to fifty-four years of age. Developmental Psychology, 1972, 6, 364.

Tomlinson-Keasey, C., & Keasey, C. B. The mediating role of cognitive development in moral judgment. Child Development, 1974, 45, 291-298.

Trowbridge, N. Effects of socio-economic class on self-concept of children. Psychology in the Schools, 1970, 7, 304-306.

XUM

Turiel, E. Conflict and transition in adolescent moral development. Child Development, 1974, 45, 14-29.

Van den Daele, L. A developmental study of the ego-ideal. Genetic Psychology Monographs, 1968, 78, 191-256.

Wegner, E. L. The effects of upward mobility: A study of working-status college students. Sociology of Education, 1973, 46, 263-279.

APPENDICES

APPENDIX A

Biographical Data Sheet

XUM

Student #_____

Age_____

Currently employed_____Yes_____No

College Major_____

Class: Freshman_____
Sophomore_____
Junior_____
Senior_____

Marital Status:
Married_____
Divorced_____
Single_____

Father's Educational Level:
Advanced degree_____
specify
University degree_____
Partial college work_____
(specify years)
High school graduate_____
Partial high school_____
(specify years)
Junior high school_____
Less than 7 years of school_____

Father's Occupation
_____
(specify)

Mother's Educational Level:
Advanced degree_____
specify
University degree_____
Partial college work_____
(specify years)
High school graduate_____
Partial high school_____
(specify years)
Junior high school_____
Less than 7 years of school_____

Mother's Occupation
Homemaker_____
Also employed____
Position_____
_____

APPENDIX B

Technical Descriptions of Piagetian Tasks

A technical description of the Piagetian task apparatus used to measure formal operations in the present study is included in this Appendix. Three separate apparatus are described, one each for the flexibility of rods, oscillation of the pendulum, and equilibrium in the balance tasks.

FLEXIBILITY OF RODS APPARATUS

The flexibility of rods apparatus is comprised of a series of various type bars firmly mounted, equidistant from the base, at one end while remaining free for deflection at the bar tip as shown in Figure 1. Construction of this apparatus consists of a wooden base with an aluminum bracket 9.6 mm thick x 51 mm wide x 378 mm long mounted at one end of the base. Aluminum mounting blocks, grooved to receive the various bars, are attached to the bracket by means of threaded fasteners that pass through the base, bracket, and blocks. The fasteners are secured in place and tension by wing nuts. Since the bars are of various configurations, mounting block grooves are machined to fit the appropriate bar. As shown in Figure 1 and the attendant tabulation, bar lengths, materials, and configurations vary.

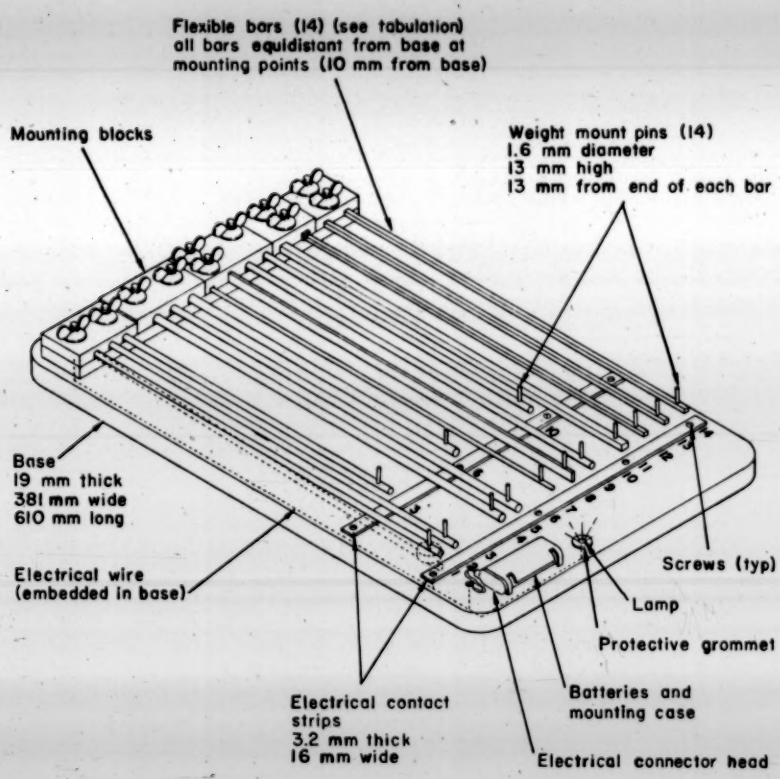

Figure 1. Flexibility of rods apparatus.

Two parallel aluminum electrical contact strips, each 3.2 mm thick x 15.9 mm wide x 368 mm long are attached to the base by brass flathead screws at the bar-end points to ensure electrical contact. The first strip is centered approximately 356 mm from the front of bracket and blocks, while the second is centered approximately 457 mm from the same reference point. Each strip is attached at a 90° angle to the protruding bars to ensure positive contact with bar free-ends when the bars are depressed. As shown in Figure 1, each bar is equipped with a steel pin to facilitate mounting of an appropriate weight.

Since the visible success or failure of the test using this apparatus is illumination, or failure of illumination, of a lamp, certain electrical circuitry is built in. A strand of 20-gauge insulated wire is electrically bonded to the rod bracket and run (in a base-bottom groove) to one electrical head connector. A second 20-gauge wire is run from the two electrical contact strips (at the bar ends) to the remaining connector. The connector head, to which both wires are electrically bonded, is of standard transistor-radio type that snaps onto the batteries mounted to the base

by a standard transistor radio (9 volt) battery case. This apparatus uses two size AA batteries in parallel to provide power to a 3-volt lamp installed in the base via a rubber grommett adjacent to the battery case. Two 20-gauge wires (embedded in the base bottom) run to the lamp, positive to the lamp end-connector and negative to the lamp metal threads, where they are electrically bonded. Therefore, when any bar is deflected sufficiently to contact either strip, a complete circuit is made, thereby illuminating the lamp.

In addition to this manufactured apparatus, weights of 40, 100, 200, and 300 grams, with holes centered to accept impingement upon the bar-end pins, are required.

Tabulation

Size, Configuration, and Free

Length of Bar Materials

Bar No.	Material	Size (mm)	Configuration	Free Length (mm)
1	Steel	6.4	Round	454
2	Brass	6.4	Round	454
3	Steel	6.4	Round	352
4	Steel	9.6	Round	454
5	Brass	9.6	Round	454
6	Brass	9.6	Round	352
7	Steel	4.0	Round	454
8	Brass	2.4 w x 8.8 d	Flat Stock	454
9	Brass	4.8	Round	454
10	Brass	6.4	Round	352
11	Brass	9.6 x 9.6	Square	454
12	Brass	6.4 x 6.4	Square	454
13	Steel	6.4 x 6.4	Square	454
14	Steel	5.6 x 5.6	Square	454

OSCILLATION OF THE PENDULUM

The oscillation of the pendulum apparatus, shown in Figure 2, consists of five components. A cast iron base supports the remainder of the assembly and provides stability during operation. A steel post extends vertically from one end of the flat base plate. Near the top of the vertical post, a horizontal bar of aluminum tubing is secured to the post by a two-thumb-screw clamp. Suspended from the horizontal bar are four pendulum lines of 7-9 kilogram monofilament. The pendulum lines are attached in a manner that will facilitate, once weighted, free-swing in an arc 90° in direction from the bar. In addition to the pendulum apparatus, weights of 50, 100, 200, and 500 grams, with hooks for attachment to the lines, are required.

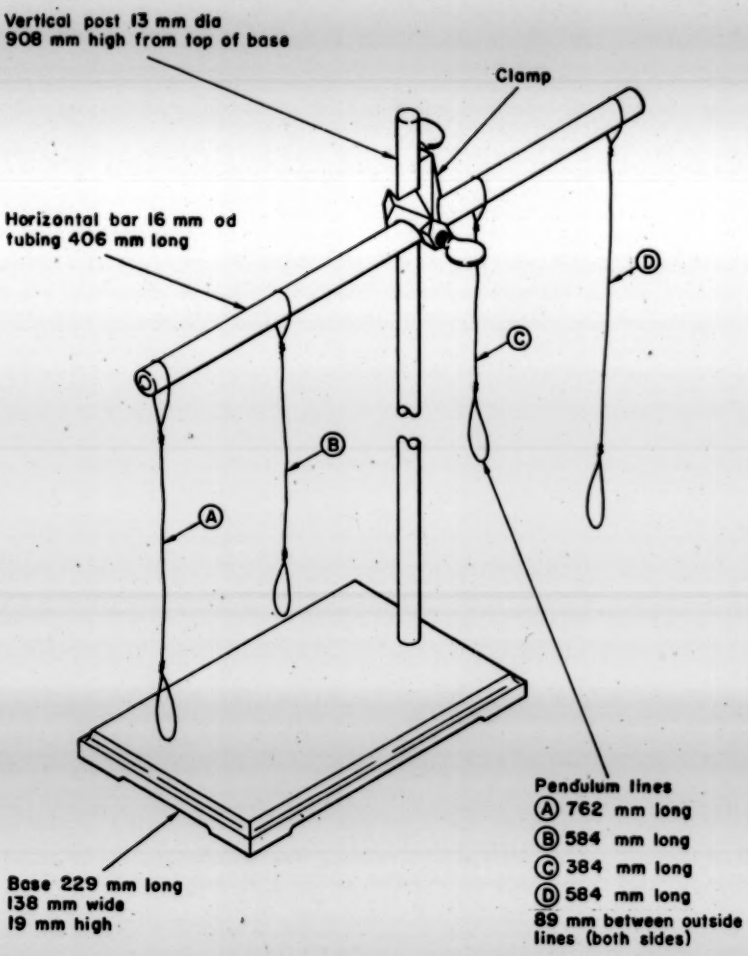

Figure 2. Oscillation of the pendulum apparatus.

EQUILIBRIUM IN THE BALANCE

The equilibrium in the balance apparatus, shown in Figure 3, consists of five components. A triangular-legged cast iron base supports a steel vertical post from the base hub. The vertical post top is slotted to accept the beam, facilitate rocking motion (pitch), and preclude side-to-side (yaw) and twisting (roll) movement of the beam. At 90° from the slot, the post is vee notched to provide limiting surfaces for the steel fulcrum key (attached to the beam at 90°) that stops beam movement at a preselected point. Below the notch, a steel axle pin is employed through the post, and a slot in the beam, to provide the axis (fulcrum) about which the beam moves. The aluminum beam is centered in the axis and has 58 holes (29 on each side of center) equally spaced. Every other hole is numbered, even numbers only, with the lowest numbers on each side of the fulcrum and progressing to the highest numbers at the beam ends.

In addition to the apparatus, weights of 1, 2, 5, 10, and 20 grams are required. The weights are equipped with hooks to facilitate suspension from the holes in the beam. In the free unweighted position, the balance bar will remain horizontal.

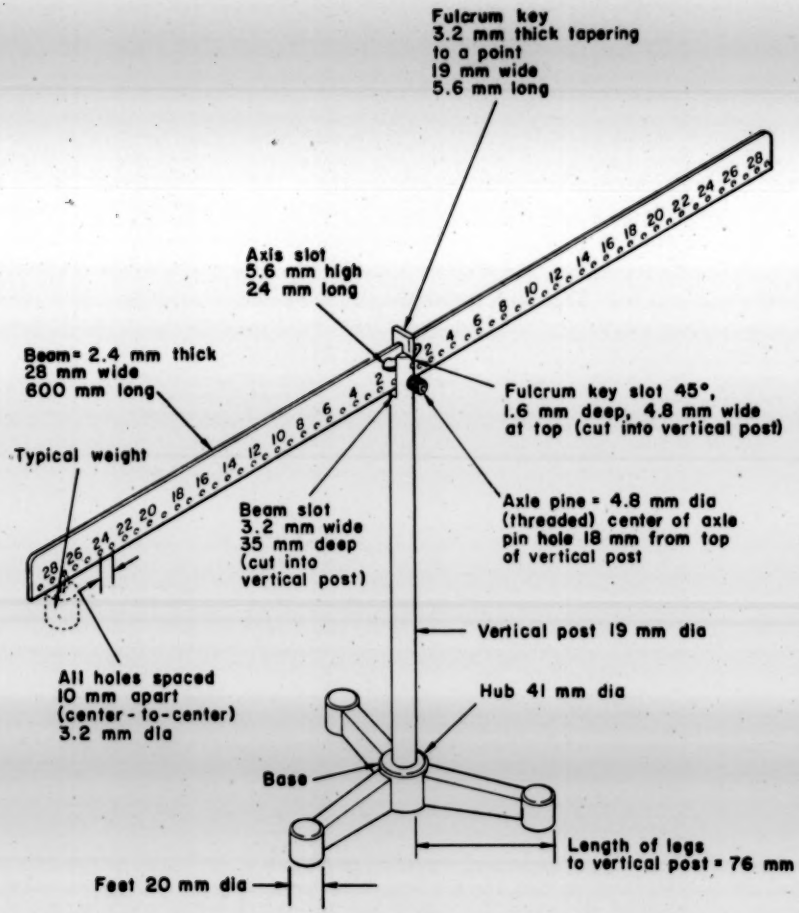

Figure 3. Equilibrium in the balance apparatus.

APPENDIX C

Questions for Balance, Pendulum, and Rods Tasks

Student #_____

BALANCE TASK

1. A. Place the 10 gram weight at hole 10-right and the 5 gram weight at hole 18-left. Tell me what you would have to do to make it balance using only those two weights?

Subject's answer:

Pass_____

Fail_____

B. Can you give me a rule or law that explains what you had to do to make it balance?

Subject's answer:

Pass_____

Fail_____

C. Try it. Describe aloud what you are doing.

Subject's description:

Pass_____

Fail_____

2. A. Place 20 gram weight at hole 10-left and the 1 gram weight at hole 20-left. Now pick up the 10 gram and the 2 gram weights. Before you attach them, tell me where you would have to put them on the right side to get the two sides to balance or be in equilibrium.

Subject's answer:

Pass_____

Fail_____

B. Why would you do that?

Subject's reason:

Pass_____

Fail_____

C. Try it. Describe aloud what you are doing.

Subject's description:

Pass_____

Fail_____

D. Give a "yes" or "no" answer to the following question: would it make any difference if you switched the positions of the 10 gram and the 2 gram weights on the right side?

Subject's answer:

Pass_____

Fail_____

3. A. Place the 10 gram weight at hole 8-right and the 5 gram weight at hole 16-left. Tell me only what would happen if the 5 gram weight were moved to the end of the bar.

Subject's answer:

Pass_____

Fail_____

B. Can you give me a rule for this occurrence?*

Subject's answer:

Pass_____

Fail_____

---

*If subject has already given a correct explanation of the law of equilibrium in the balance in 1-B, 2-B or 2-C, there is no need to ask this question again. Just give the subject a pass score.

4. A. Take up the 20 gram weight and the 10 gram weight and the 5 gram weight. Tell me first before you attach them, what you would have to do to get a balance if you put 20 grams on one side and the 10 gram and 5 gram weights on the other side.

Subject's answer:

Pass_____

Fail_____

B. Try it. Describe aloud what you are doing.

Subject's description:

Pass_____

Fail_____

C. Can you offer a rule or guide that takes into account the weight and distance from the center?*

Subject's answer:

Pass_____

Fail_____

5. A. Place the 10 gram weight at hole 18-right and the 20 gram weight at hole 10-left. Observe the balance arm in its present position. Now visualize the balance arm as if it were in the horizontal position. The intersection of the two positions of the balance arm (the one before you and the one you are visualizing) form an angle on each side. What can you tell me about these angles?

Subject's answer:

Pass_____

Fail_____

B_1. Compare the vertical distances ($height_1$ and $height_2$) the two weights moved from the horizontal position. Did $height_1$ move more, did $height_2$ move more, or did they both move the same amount?

Subject's answer:

Pass_____

Fail_____

B_2. Is there any relationship between the distance one weight moved compared to the other?

Subject's answer:

Pass_____

Fail_____

C_1. Does it take more work to make this 10 gram weight go up, this 20 gram weight go down, or does each weight take the same amount of work?

Subject's answer:

Pass_____

Fail_____

C_2. What can you tell me about the work needed to move them?

Subject's answer:

Pass_____

Fail_____

D. Why doesn't the 20 gram weight swing down to the bottom (stop) instead of remaining where it is?

Subject's answer:

Pass_____

Fail_____

E. Can you offer me a rule or guide that takes into account the weight and the distances in height the two weights moved?

Subject's answer:

Pass_____

Fail_____

Student #_____

PENDULUM TASK

1. A. Just from what you have seen and I have told you thus far, can you tell me what factor or factors affect the speed, rate, or frequency of the pendulum swing past the vertical post?

   Subject's answer:

   Pass_____

   Fail_____

   B. Answer this next question with a "yes" or "no." Are there any other factors that affect the speed, rate, or frequency of the pendulum swing past the vertical post?

   Subject's answer:

   Pass_____

   Fail_____

   (If subject answers "yes," ask him to name them.)

2. A. Answer this next question with a "yes" or a "no." Does the length of the string make any difference in the speed, rate, or frequency of the pendulum swing past the vertical post?

   Subject's answer:

   Pass_____

   Fail_____

B. Explain your answer in just a few words:

Subject's explanation:

Pass_____

Fail_____

C. Demonstrate your answer with these materials and describe aloud what you are doing.

Subject's demonstration AND description:

Pass_____

Fail_____

3. A. Answer "yes" or "no" to this question:
Does the weight of the bob make any difference in the speed, rate, or frequency of the pendulum swing past the vertical post?

Subject's answer:

Pass_____

Fail_____

B. With these materials, demonstrate your answer and describe aloud what you are doing.

Subject's demonstration AND description:

Pass_____

Fail_____

4. A. Answer "yes" or "no" to this question:
Does the height from which you let go or drop the bob make any difference in the speed, rate, or frequency of the pendulum swing past the vertical post?

Subject's answer:

Pass_____

Fail_____

B. With these materials, demonstrate your answer and describe aloud what you are doing.

Subject's demonstration AND description:

Pass_____

Fail_____

5. A. Answer "yes" or "no" to the following question: Does the amount of push or impetus that you give to the bob make any difference in the frequency of the swing past the vertical post?

Subject's answer:

Pass_____

Fail_____

B. With these materials, demonstrate your answer and describe aloud what you are doing.

Subject's demonstration AND description:

Pass_____

Fail_____

6. Now can you give me a concluding or summary statement: a simple, concise, and inclusive rule as to what determines the speed, rate, or frequency of the pendulum swing?

Subject's answer:

Pass_____

Fail_____

Student #_____

RODS TASK

1. A. Just from what I have told you and you have seen thus far of this task, can you tell me what factor or factors influence the bending or flexibility of the rods on this board?

Subject's answer:

Pass_____

Fail_____

2. A. Visualize the 100 gram weight on rod 1, and then the 300 gram weight on rod 1. Would rod 1 bend more with the 100 gram weight, with the 300 gram weight, or would it bend the same with both weights?

Subject's answer:

Pass_____

Fail_____

B. What factor is responsible for the (equality-difference) in bending or flexibility?

Subject's answer:

Pass_____

Fail_____

C. Try it.

3. A. Visualize placing 200 gram weight on rod 1 and then on rod 2. Would rod 1 bend more, would rod 2 bend more, or would they both bend the same?

Subject's answer:

Pass_____

Fail_____

B. What factor is responsible for the (equality-difference) in bending or flexibility?

Subject's answer:

Pass_____

Fail_____

C. Try it.

D. Here is a 300 gram weight. First, tell me your selection, and then only demonstrate exactly the same test that you just made with rods 1 and 2, but with another pair of rods.

Subject's answer:

Pass_____

Fail_____

4. A. Visualize 300 grams on rod 1 and then on rod 3. Would rod 1 bend more, would rod 3 bend more, or would they both bend the same?

Subject's answer:

Pass_____

Fail_____

B. What factor is responsible for the (equality-difference) in bending or flexibility of the rods?

Subject's answer:

Pass_____

Fail_____

C. Try it.

D. Here is a 200 gram weight. First tell me your selection and then demonstrate exactly the same test that you just made with rods 1 and 3, but with another pair of rods.

Subject's answer:

Pass_____

Fail_____

5. A. Visualize the 200 gram weight on rod 5 and then on rod 2. Would rod 5 bend more, rod 2 bend more, or would they both bend the same?

Subject's answer:

Pass_____

Fail_____

B. What factor is responsible for the (equality-difference) in bending or flexibility?

Subject's answer:

Pass_____

Fail_____

C. Try it.

D. Here is a 300 gram weight. First, tell me your selection, and then demonstrate exactly the same test that you just made with rods 5 and 2, but with another pair of rods.

Subject's answer:

Pass_____

Fail_____

6. A. Visualize 240 grams on rods 1 and 13. Would rod 1 bend more, rod 13 bend more, or would they both bend the same?

Subject's answer:

Pass_____

Fail_____

B. What factor is responsible for the (equality-difference) in bending or flexibility?

Subject's answer:

Pass_____

Fail_____

C. Try it.

D. Here is a 340 gram weight. Select first and then demonstrate exactly the same test that you just made with rods 1 and 13, but with another pair of rods. Select ONLY from rods 1 through 13.

Subject's answer:

Pass_____

Fail_____

7. Place the 40 gram weight on rod 7 and then on rod 9. Assume their bending or flexibility are equal. What factors determine the similarity in flexibility of rods 7 and 9?

Subject's answer:

Pass_____

Fail_____

8. Place the 240 gram weight on rods 1 and 14. Assume their bending or flexibility are equal. What factors determine the similarity in flexibility of these rods 1 and 14?

Subject's answer:

Pass_____

Fail_____

9. If you were to place the same weight on each of the first four rods on this board, how would you rank order them from least to most flexible?

Subject's answer:

Pass_____

Fail_____

BIOGRAPHICAL SKETCH

M. Ann (Mohr) Cauble was born in Indianapolis, Indiana. She received her elementary and secondary schooling in Indianapolis, graduating from George Washington High School. She attended Purdue University in West Lafayette, Indiana for several years after her marriage to Donald L. Cauble. She then spent the following years rearing their four children. After the family moved to Arizona, Mrs. Cauble resumed and completed her undergraduate studies at Arizona State University, earning a BA in Education with high distinction. She then received an MS in Home Economics. She completed her PhD work while employed as a Lecturer in Family Relationships and Child Development in the Home Economics Department, College of Liberal Arts, Arizona State University.